AUTOMOTIVE INDUSTRIES

AUTOMOTIVE and AVIATION MANUFACTURING
ENGINEERING • PRODUCTION • MANAGEMENT

NOVEMBER 15, 1954

In This Issue

Vast Array of Advancements in 1955 Cars
Lincoln's New Automatic Transmission
Design Features of Plymouth V-8 Engine
Automation in Transmission Manufacturing
Forecast of 1954 Vehicle Registrations
De Havilland Aircraft Production in Canada

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A CHILTON PUBLICATION

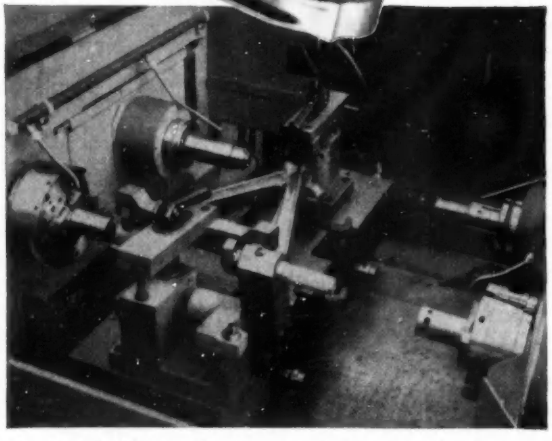
DOWN LIKE A FEATHER!

. . . a little safer, a little smoother because this part was BORIZED*

You're heading for the runway on final approach — fifty tons of airliner hurtling through space at over 100 miles an hour, yet settling to the earth as lightly as a feather. This is the time when a lot of things must work *just right*.

That they do so, thousands of times a day at airports the world over is a real tribute to the aviation industry. Such performance is made possible only through the utmost precision in every step of manufacture. That's why so many parts of the modern aircraft are borized. Here, for example, is a torque arm for a landing gear, borized on a Heald Model 422 Bore-Matic.

Whenever a part is borized, you can be sure of three things. A finer, longer-lasting, precision made part. Important savings in time and production cost. A definite competitive advantage for your product. That's why IT PAYS TO COME TO HEALD.



This Model 422, is used to bore, counterbore and chamfer seven different torque arms for landing gear components. Aligning rails on both the boringhead bridges and the fixture sub-base aid in accommodating the various parts.

Basic fixture equipment consists of angle plate type with swinging gate locator and hand cam clamps — gate locator is interlocked so that machine will not operate unless part is correctly located.

* *Precision finished by a Heald-engineered method on a Heald Bore-Matic.*

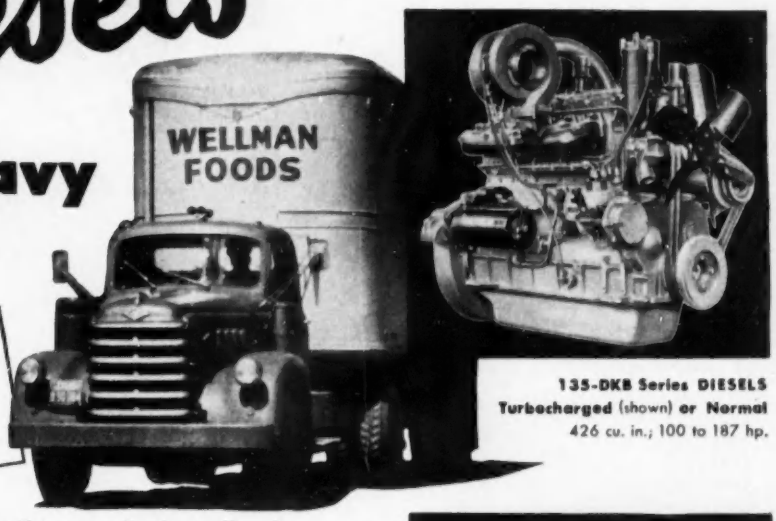
THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

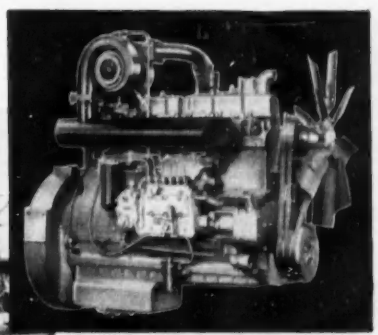
WAUKESHA *Diesels*

for fast, heavy hauls...



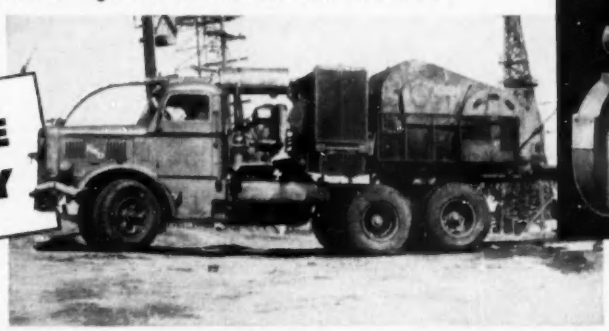
CROSS COUNTRY

...where the pay-off is on payload—you'll make more miles and cut costs, too, with these modern feature-packed truckers' engines—Waukesha 135 Series Diesels.

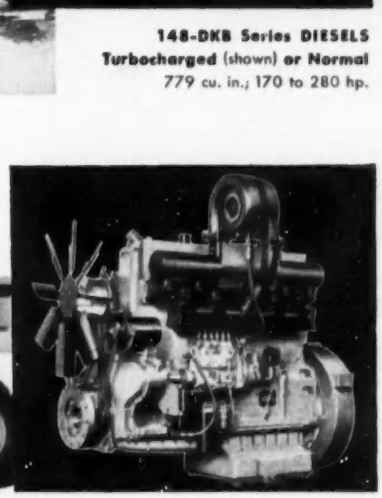


135-DKB Series DIESELS
Turbocharged (shown) **or Normal**
426 cu. in.; 100 to 187 hp.

OFF THE HIGHWAY

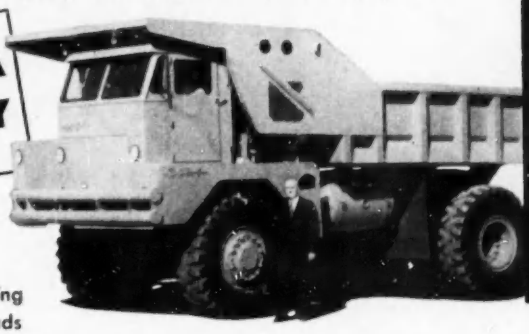


...in and out...down and up...over and through ...go the trucks with Waukeshas—148 Series Diesels putting out the power that pulls and pays.



148-DKB Series DIESELS
Turbocharged (shown) **or Normal**
779 cu. in.; 170 to 280 hp.

EXTRA HEAVY-DUTY



...those tremendous, crushing 30-ton, 35-ton, 40-ton loads ...up stiff grades, without faltering or breakdown ...day after day—with Waukesha WAKDB Series Diesels.

WAKDB Series DIESELS
Turbocharged (shown) **or Normal**
1197 cu. in.; 240 to 350 hp.

Send for Bulletins

262

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.
New York **Tulsa** **Los Angeles**

MATTISON
Here is a Mattison three head Vertical Spindle Rotary Automatic Grinder at the Ford Cincinatti Automatic Transmission Plant, finishing converter housings to close limits of accuracy on a real production basis. Work pieces are held in automatic clamping fixtures. Automatic sizers are constantly in operation, checking the work and keeping all pieces within specified tolerances without operators attention.
This is only one of the many grinders made by Mattisons. Whatever your surface grinding problem may be, write us for our recomendation on the proper method and machine for your job.
MATTISON
MACHINE WORKS
ROCKFORD · ILLINOIS

A CHILTON MAGAZINE AI PUBLISHED SEMI-MONTHLY

AUTOMOTIVE INDUSTRIES

NOVEMBER 15, 1954 VOL. III, NO. 10

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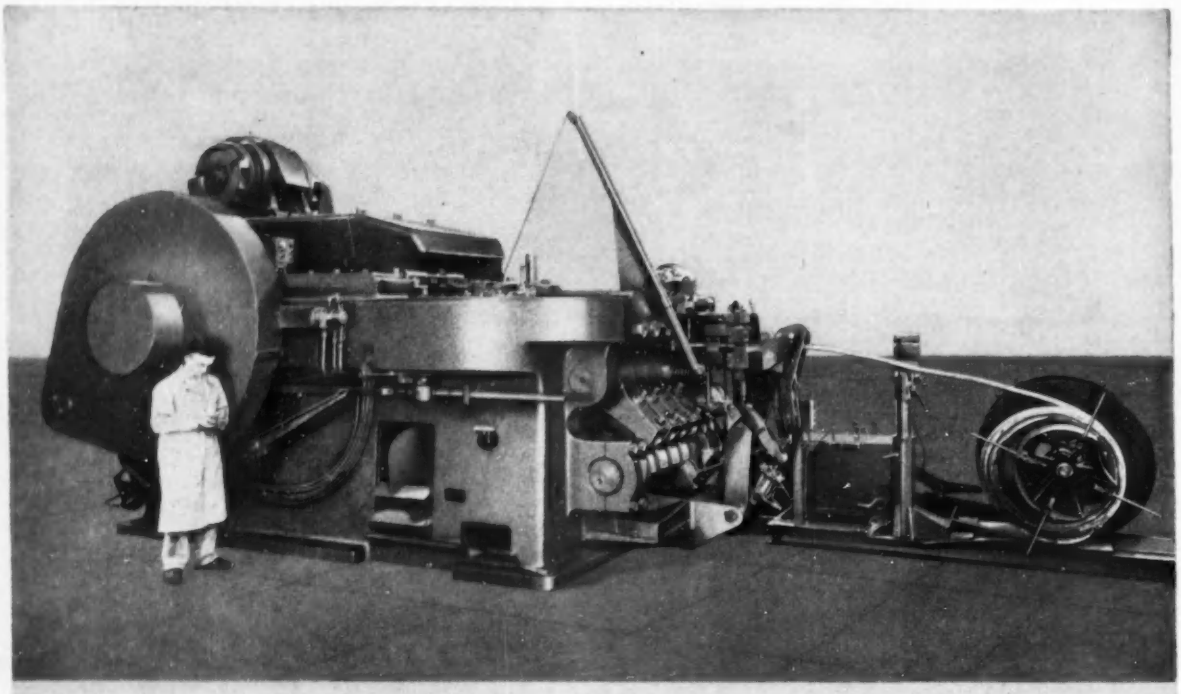

AUTOMATIC FORGING MACHINES!

This is the largest high-speed automatic cold-forming machine yet built, and larger ones are in the works.

Using 1-1/2-inch diameter coiled hot-rolled stock, this 200,000 pound machine, designed and built by NATIONAL, automatically produces 40 clean, accurate parts per minute!

Through the years we have teamed up with industry on many novel automatic hot and cold forging installations — for making a wide variety of fasteners, automotive and aircraft components, and other parts.

If you need to make metal parts faster, stronger and at lower cost, let us work with you. Send us your prints and samples, or better yet, visit us. No obligation.

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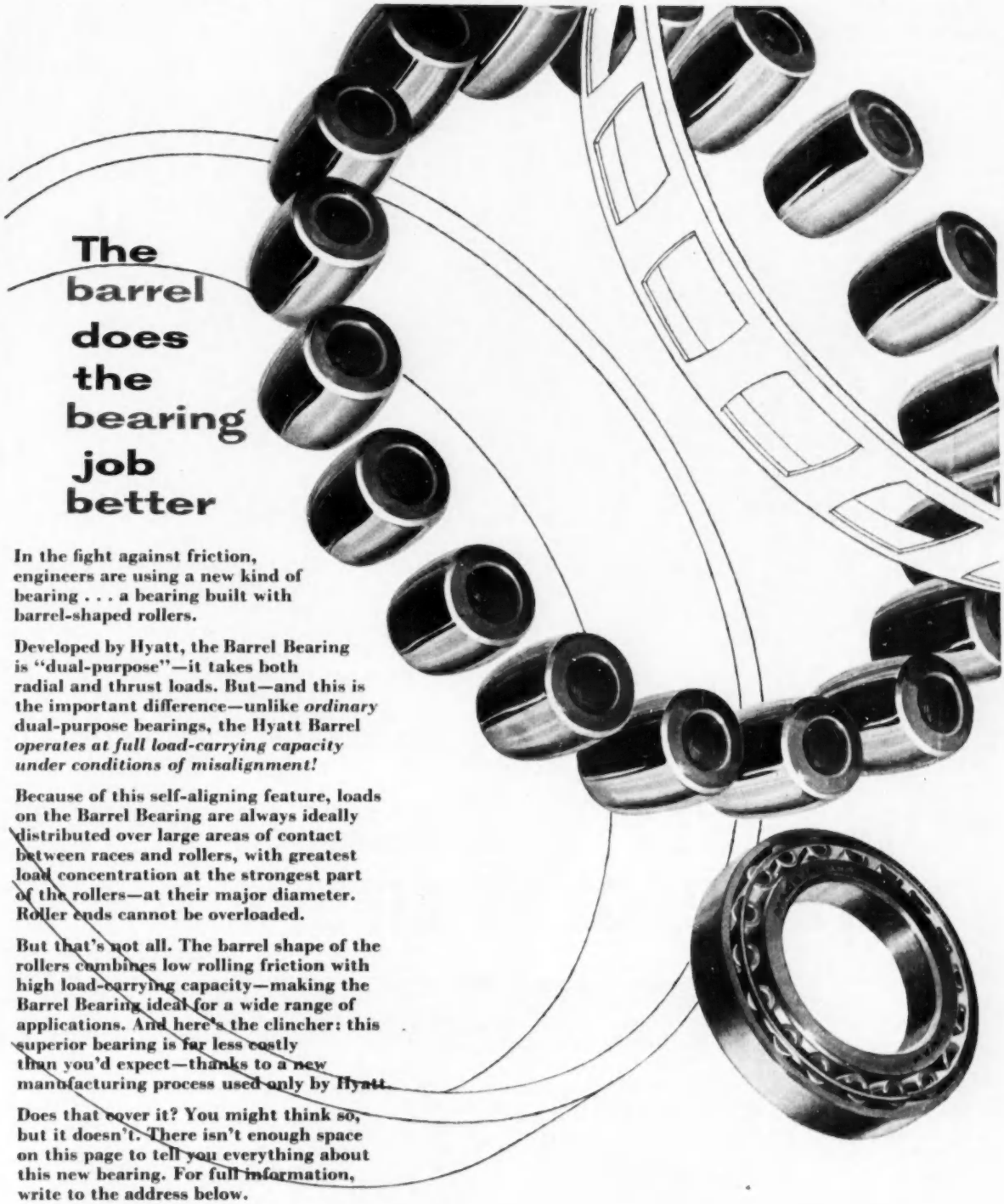


The barrel does the bearing job better

In the fight against friction, engineers are using a new kind of bearing . . . a bearing built with barrel-shaped rollers.

Developed by Hyatt, the Barrel Bearing is "dual-purpose"—it takes both radial and thrust loads. But—and this is the important difference—unlike *ordinary* dual-purpose bearings, the Hyatt Barrel *operates at full load-carrying capacity under conditions of misalignment!*

Because of this self-aligning feature, loads on the Barrel Bearing are always ideally distributed over large areas of contact between races and rollers, with greatest load concentration at the strongest part of the rollers—at their major diameter. Roller ends cannot be overloaded.

But that's not all. The barrel shape of the rollers combines low rolling friction with high load-carrying capacity—making the Barrel Bearing ideal for a wide range of applications. And here's the clincher: this superior bearing is far less costly than you'd expect—thanks to a new manufacturing process used only by Hyatt.

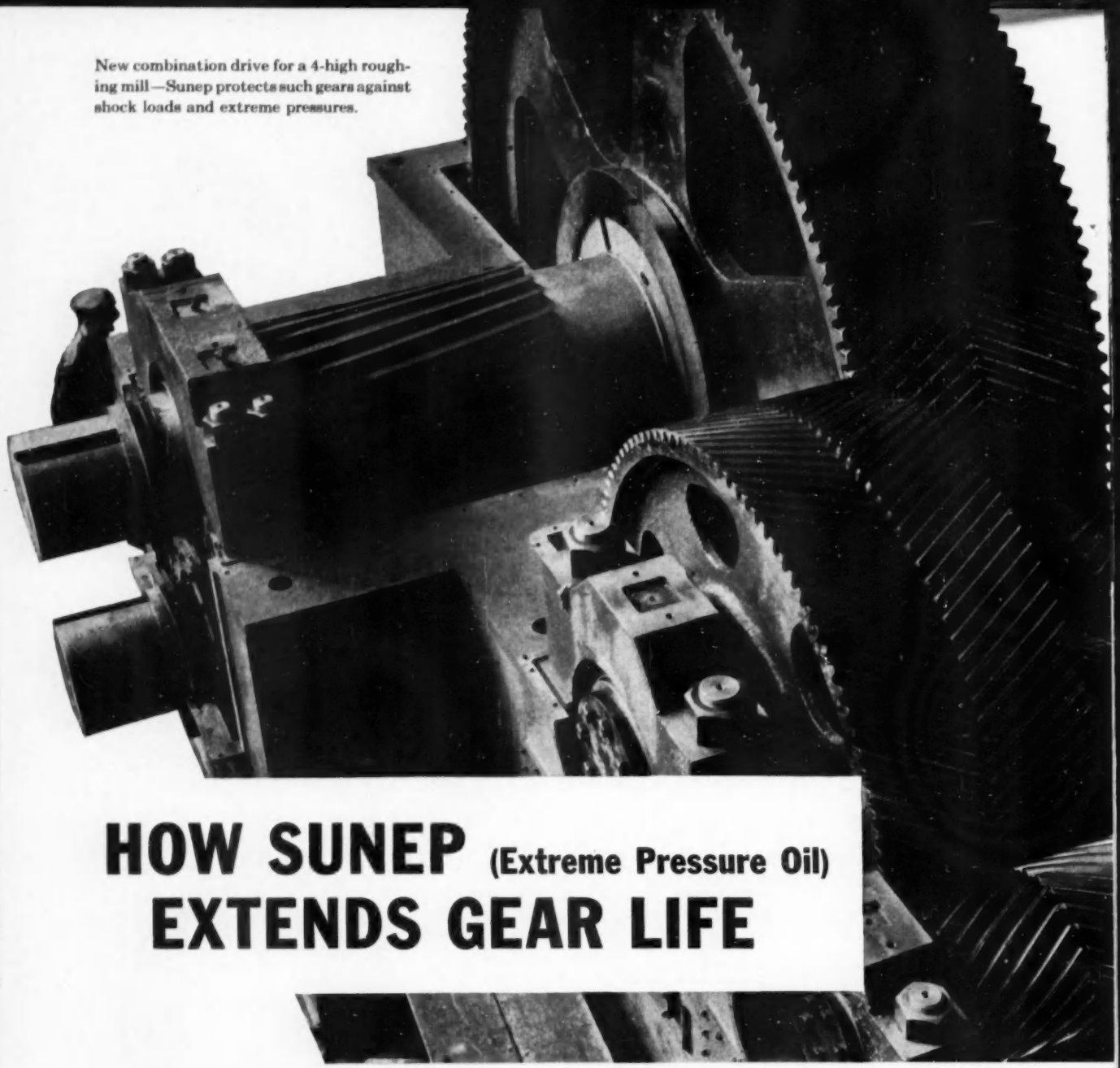
Does that cover it? You might think so, but it doesn't. There isn't enough space on this page to tell you everything about this new bearing. For full information, write to the address below.

HYATT

STRAIGHT ○ BARREL ○ TAPER ○

ROLLER BEARINGS

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION • HARRISON, N. J.



New combination drive for a 4-high roughing mill—Sunep protects such gears against shock loads and extreme pressures.

HOW SUNEP (Extreme Pressure Oil) EXTENDS GEAR LIFE

The advantage of running your machines at high speeds and under heavy loads can be quickly lost if your extreme pressure lubricants turn thick, lose film strength, or cause gears to corrode.

Sunep gives your gears better protection longer. Unlike many E.P. oils, Sunep is made from highly refined, premium grade oils skillfully blended with chemical additives that do not drop out during operation or in prolonged storage. This accounts for several rare user benefits: long life at extreme pressures; absence of corrosion—even on bronze; rust protection for steel parts; clean gears and bearings as a result of the oil's high stability.

Primarily a lubricant for enclosed gears, Sunep has proven to be highly effective on bearings and screws working under extreme pressures. Because of its exceptional clinging characteristics, Sunep guards against metal-to-metal contact during the early moments of machine operation after shutdown. FREE BULLETIN. Tells all about Sunep. Get your copy. Write Dept. AA-11.

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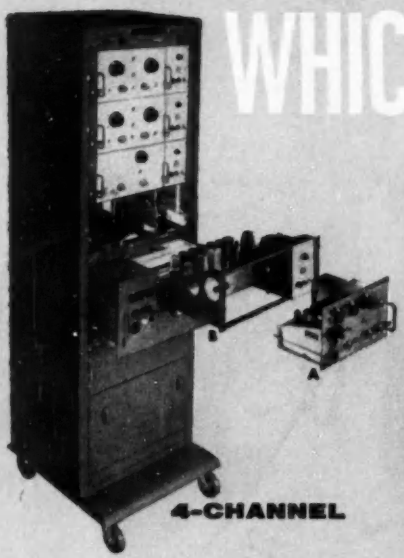
WHICH "150" fits your oscillographic recording need?



4-CHANNEL

As a graphic example of the design idea that has brought new versatility to industrial recording, a Carrier Preamplifier (A) is shown above in position to plug into a Driver Amplifier in framework with Power Supply (B) which are normally already in place in the Basic Cabinet Assembly.

The identical design principles of the four-channel system are provided in the two-channel, the only difference being the number of channels.

Sanborn "150" Recording Systems that put to use the original design concept of amplifier interchangeability (illustrated at the left) start with either a four-channel or two-channel standard Basic Assembly, to which the user adds whatever selection or combination of pre-amplifiers (A) are needed for his recording problem. The standard Basic Assemblies comprise a metal Cabinet, Recorder, and a built-in Driver Amplifier and Power Supply (B) for EACH channel. Presently available Preamplifiers are: AC-DC, Carrier, DC Coupling, Servo Monitor, Log-Audio, and Low Level Chopper.

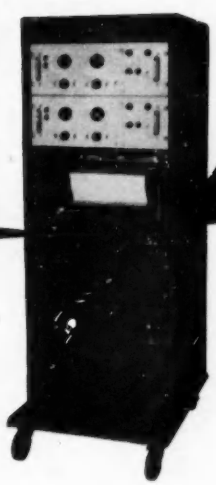
Advantages common to ALL Sanborn Recorders are: inkless recording (by heated stylus) on plastic coated strip chart paper, and in true rectangular coordinates . . . high torque galvanometer movement . . . time and code markers . . . numerous paper travel speeds.

2-CHANNEL

"150"

COMPLETE FOUR-CHANNEL SYSTEM FOR USE WITH ANALOG COMPUTERS

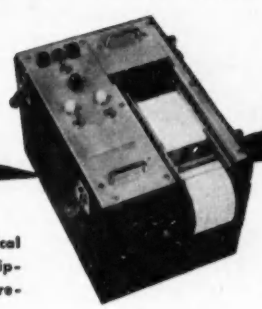
This "150" system consists of a Cabinet Assembly, a four-channel Recorder, and *two* dual channel DC Amplifiers. Each amplifier is complete with a common power supply. Each measures and records two separate single-ended signals, at sensitivities between one and one hundred volts per centimeter. The *two*-channel version of this system will comprise Cabinet, *two*-channel Recorder, and *one* dual channel amplifier.



"150"

SINGLE-CHANNEL RECORDER

A compact, lightweight unit for use when only one channel is required — provides permanent, inkless recording in *true* rectangular co-ordinates; *five* paper speeds (5, 10, 25, 50, 100 mm/sec.); *extra* stylus for either manual or remote timing and coding marks. Designed for simple, patch cord connection to *any* of the several "150" preamplifiers (plus driver amplifier and power supply), available soon in portable metal cases.



Ask, also, for a copy of the *Right Angle* — a Sanborn publication devoted to oscillographic recording in industry.

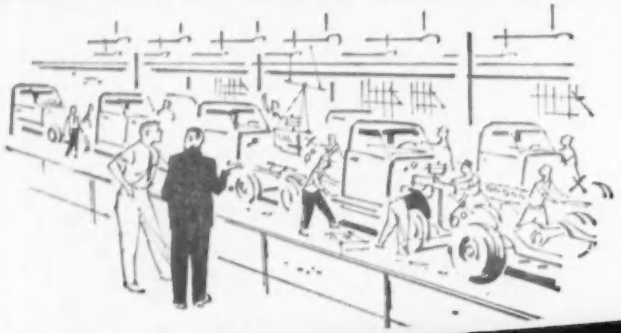
Catalog and technical data on all "150" equipment available on request.

SANBORN COMPANY

Industrial Division

CAMBRIDGE 39, MASS.

if the FLEET OWNER built his own trucks—



ZENITH CARBURETORS

would be *his* choice

They say it's a buyer's market. Well the truth is, for the truck operator, it's always been a buyer's market.

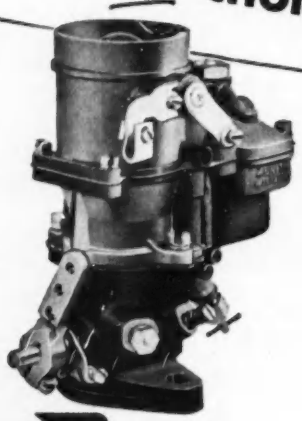
No American businessman sets more exacting standards than the fleet operator in his purchase of new equipment. There is good reason for this, for the operator's success or failure is to a very large degree determined by the efficiency of the vehicle he employs.

This yardstick of efficiency is likewise applied to every component part that contributes to truck performance.

That's why you can be certain if truck operators built their own trucks, Zenith* would be the choice for standard equipment.

One more reason why—if you build, buy, sell or operate trucks, Zenith should be *your* choice for the best in carburetion.

*REG. U.S. PAT. OFF.



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We invite discussion of *any* steering problem.

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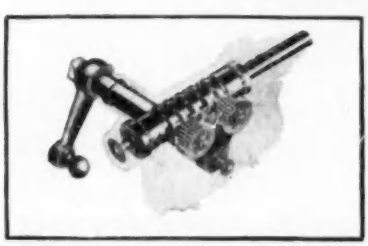
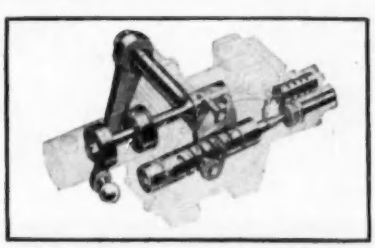
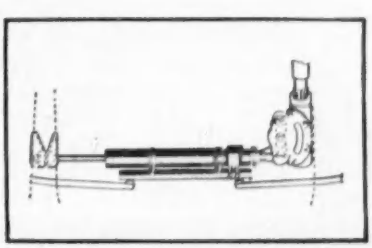
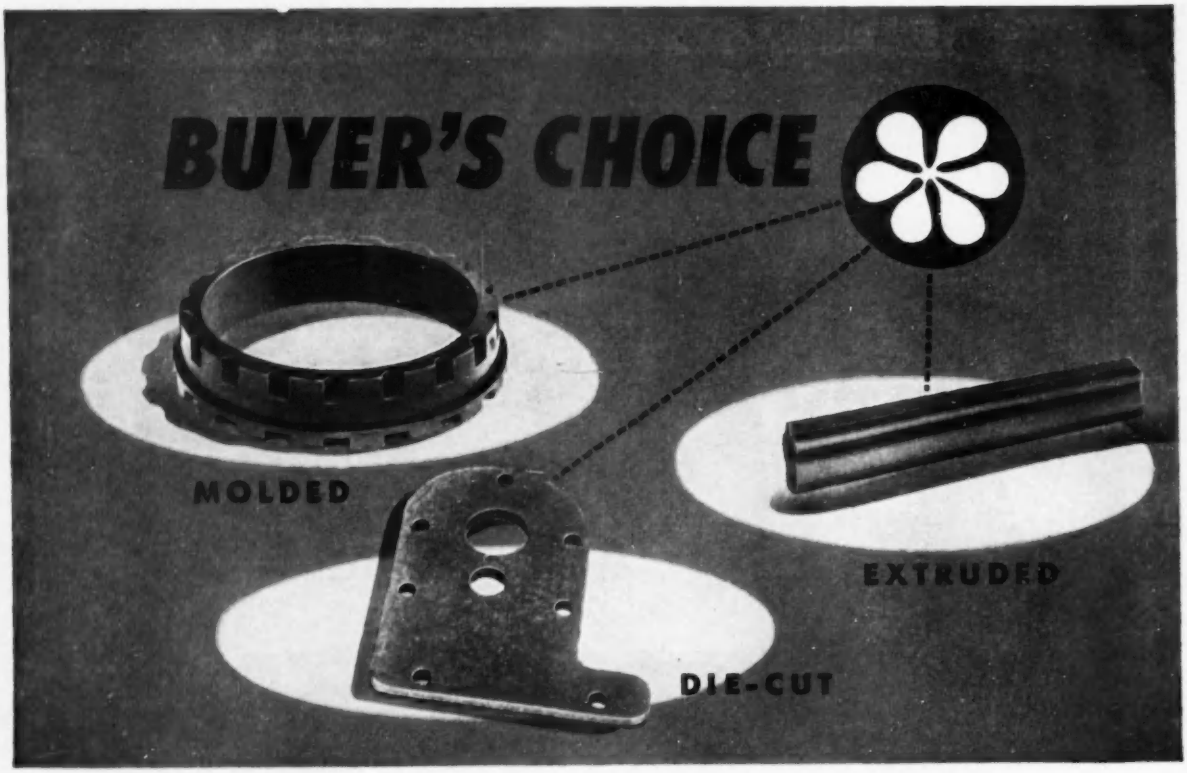






CAM & LEVER MANUAL . . . HYDRAPOWER INTEGERAL . . . HYDRAPOWER LINKAGE



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With Acadia you have a *choice!* Not only molded rubber . . . not only molded and die-cut . . . not only extruded rubber . . . but rubber parts any way you require! Better yet, Acadia uses whatever method the requirements of the job and you dictate is the *best* way to do it.

Acadia is especially sensitive to your specifications. We will process synthetic components for oil-resistance—good aging properties—resistance to heat—any characteristic you're seeking, or a combination of characteristics. Acadia parts are cut, molded or extruded to all required shapes, sizes and types, with almost unlimited applications.

Also, we offer Acadia SILICONE Rubber, molded or extruded for gaskets, seals, "O" rings, washers, sheets, cut-parts and packings. This is the rubber that will stay resilient at 100° *below* zero, or 500° above!

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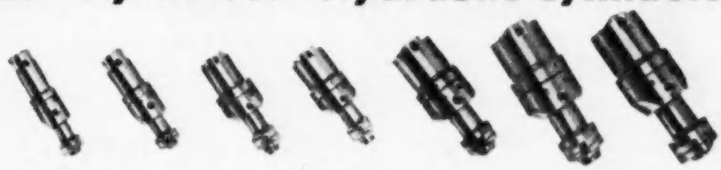
MANUFACTURERS AND CUTTERS OF WOOL FELT

how leading car, truck and trailer builders solve production riveting problems with Hannifin "HY-POWER" Hydraulics

1 They select the correct size "Hy-Power" Hydraulic Cylinders

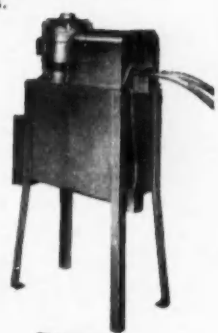


Hannifin supplies "Hy-Power" Hydraulic Cylinders in 7½ to 100-ton capacities (more in multiple) to exert the force exactly when and where you want it.

2 They mount the cylinders in Hannifin "C"-Frames

The "Hy-Power" line includes standard "C"-frames in a wide variety of sizes and types for portable or stationary use. Or, if your requirements are special, Hannifin will design and build "C"-frames to suit your needs.

3 Power source is the exclusive "Hy-Power" Pressure Generator



Here's Hannifin's patented, noiseless pressure generator. It's a compact unit that combines motor, pump, oil reservoir, control valves and high-pressure intensifier.

HANNIFIN "HY-POWER" RIVETING IS THE LONG-TIME STANDARD OF THE AUTOMOTIVE INDUSTRY

If you're looking for a better riveting method—whether you need one riveter or fifty—discuss it with your Hannifin representative. Meanwhile, get the full story by writing for Bulletin 150.

HANNIFIN

Hannifin Corporation, 543 S. Wolf Rd., Des Plaines, Ill.
Air and Hydraulic Cylinders • Hydraulic Presses • Pneumatic Presses • "Hy-Power" Hydraulics Air Control Valves

"He who makes no mistakes does nothing"

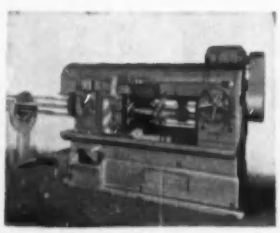
In a supposedly modern era it is sometimes claimed to be "smart business" to let a competitor take the lead and make profit from his mistakes. Obviously, if all business adhered to such a philosophy there would be no progress, if any business. "He who makes no mistakes does nothing". Cone leadership was founded — and is maintained — by active service, by doing things.

The Conomatic Carbide Development program expects to make a few mistakes. But, loss or gain, its efforts will contribute to the general benefit of all "automatic" users, users on whom all "automatic" builders are dependent.

The job illustrated compares actual production runs with HSS and 100% carbide tooling. It suggests the kind of pioneering that is being done at Cone. Full details are available.

MATERIAL—1112 STEEL: Hole drilled with 1" dia. drill to 2¾" depth. OD threaded to 2" length with 1¼"—12 chasers.

	HSS	CARBIDE
Cycle Time	90 secs.	15 Secs.
Work Spindle Speed	370 R.P.M. at 103 S.F.	1500 R. P. M. at 417 S. F.
Tool Wear	1500 pcs. per grind	5000 pcs. per grind



Conomatic } CONE AUTOMATIC MACHINE COMPANY, INC. WINDSOR, VT., U.S.A.

It's welded—
but you can't feel the weld

It has to be accurate

It's easy to fabricate

Specify Brainard FOR WELDED STEEL TUBING

● Brainard welded tubing is an economical structural material, and offers many physical advantages. It has a smooth exterior, with all weld flash removed. Its wall thickness is uniform, since it is formed from flat strip. With welded tubing you can cut weight without sacrificing strength. And there's practically no limit to the design requirements you can meet with this easily fabricated material.

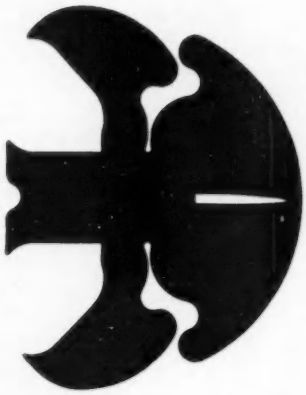
Brainard maintains continuous quality control throughout manufacture—from ore to finished tubing. Careful supervision assures you high quality. For complete specifications call or write Brainard Steel Division, Dept. W-11, Griswold St., Warren, Ohio.

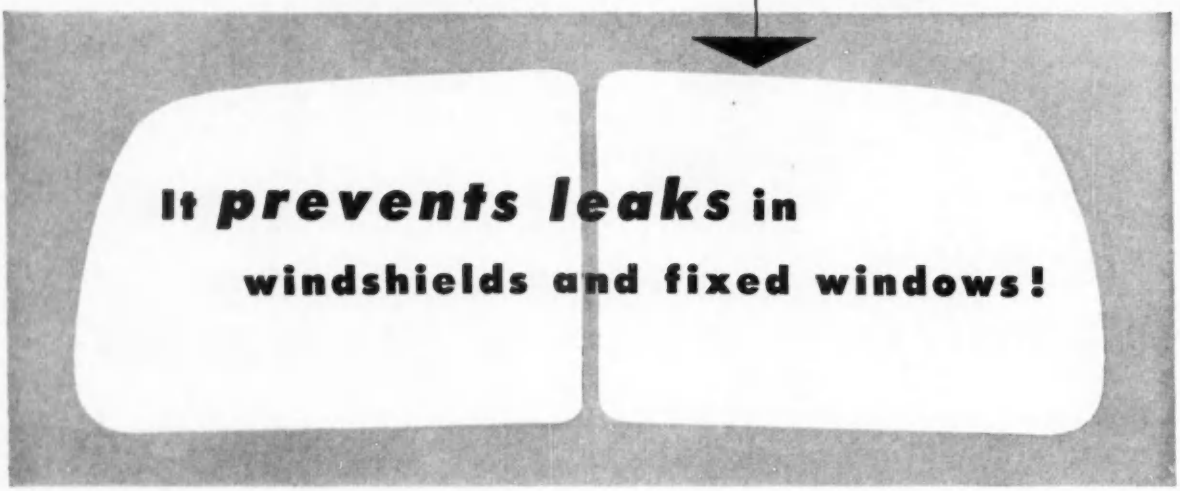
Brainard

SHARONSTEEL

STEEL DIVISION
SHARON STEEL CORPORATION

Wandering water hates this shape!





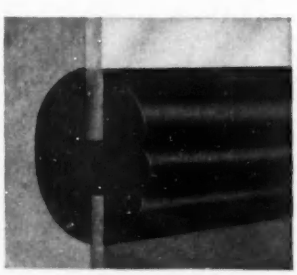
Why would water hate a shape like this? Well, this odd shape is one of dozens of scientifically designed cross-sections of Inland Self-Sealing Weather Strip, and it completely foils any water that wants to find its way around your windows and into your vehicles.

The idea of designing a shaped weather strip, under permanent compression to form an absolutely watertight window seal without cement or binders has revolutionized window installation. It is self-sealing and permanent. It assures complete, lasting leak-proofing. And only Inland can supply it!

Look at the cutaway picture shown here. You can see how Inland Strip works. It uses less material, permits fast installation, cuts costs. It's best for the vehicle *manufacturer,* and it's best for the user, because it gives safer driving, longer service, and lower glass-replacement cost.

Here's how it works!

One form of Inland Self-Sealing Weather Strip is shown here. The Strip goes into the body panel or other opening. The glass then goes into the Strip. Then the filler strip goes into the locking channel, expanding it, compressing the whole Weather Strip into a complete and permanent leak-proof seal on both the body panel and the glass!



INLAND MANUFACTURING

Self-Sealing WEATHER STRIP

INLAND MANUFACTURING DIVISION, General Motors Corporation, Dayton, Ohio

CAN YOU TURN NON-PRODUCTIVE TIME INTO SAVINGS LIKE THESE?

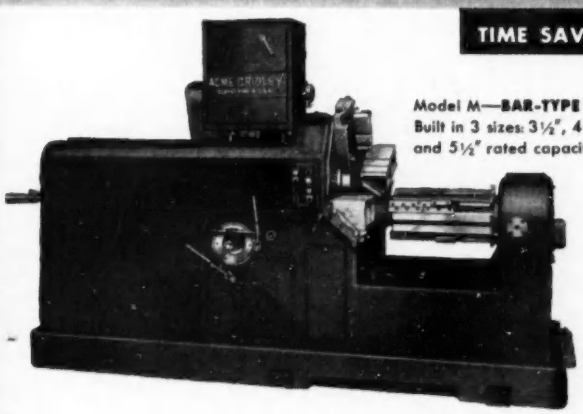
On each of the examples shown here, most of the savings resulted from reducing the time between cuts. Almost all modern machines can make chips as fast as present day cutting tools can "take it," but only Automatically Controlled Cycle* gives you an opportunity to save where it counts most — by reducing non-productive time required to withdraw the tool, index the turret and advance the tool to the work. Acme-Gridley Fully Automatic Turret Lathes do this job at accelerated speeds — with minimum waste of time and manpower

TIME SAVED on Acme-Gridley Fully Automatic Chuck-Type Turret Lathe

Model MC—**CHUCK-TYPE**
Rated capacity 12".

Part Name	Finger Holder Body	Master Collet Blank
Material	6⅛" dia. Semi-Steel	6" dia. 4160 Steel (Solid Slug)
Former Time	39.2 minutes	98 minutes
"MC" Time	11.2 minutes	35.4 minutes
	Savings 28 Min.	**Savings 62.6 Min.**

TIME SAVED on Acme-Gridley Fully Automatic Bar-Type Turret Lathe



Model M—**BAR-TYPE**
Built in 3 sizes: 3½", 4¼" and 5½" rated capacities

Part Name	Sleeve—4x3¼" long	Whirl—3½x4⅝" long
Material	1112 Steel	Leaded Open Hearth Steel
Former Time	30 minutes	21 minutes
"M" Time	6 minutes	5.7 minutes
	Savings 24 Min.	**Savings 15.3 Min.**

Here's what AUTOMATICALLY CONTROLLED CYCLE* means to you

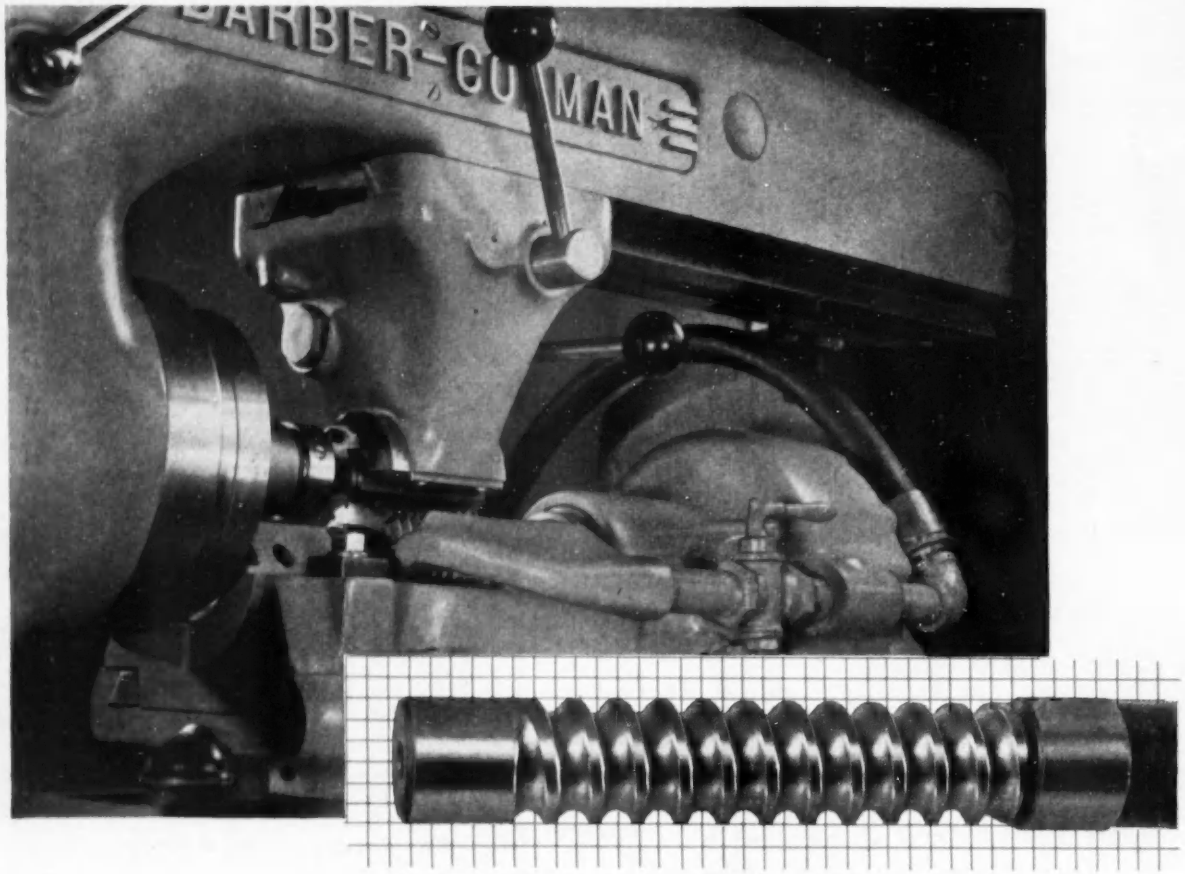
- **The complete machining cycle is faster because all non-productive movements are performed automatically — and at *accelerated* speeds.**
- **Cuts are made (with either high-speed or carbide tooling) as fast as present day cutting tools can take it.**
- **Producing rate is thus predetermined and remains the same at the end of the shift as at the start.**
- **Machining is done at the surface speed best suited for required finish and tolerance because each toolslide is independently cammed and selective spindle speeds are automatically controlled.**

**Standard on all Acme-Gridleys*

The NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

ACME-GRIDLEY BAR and CHUCKING AUTOMATICS
1-4-6 and 8 Spindle • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Tapse Limit, Motor Starter and Control Station Switches • Solenoids • Contract Manufacturing.



Standard Hobbing Machines Solve Special Problems

standard barber-colman machines with special tooling cut internal and external threads

The wide range of versatility to be found in the basic design of Barber-Colman Hobbing Machines is illustrated by these internal ball nut and worm shaft threading applications. Standard units and assemblies are used wherever possible for these special applications.

A standard No. 14-15 Hobbing Machine has been equipped with a special hob slide, special work support bracket and modified gear train to thread mill this worm shaft steering part with ease and production economy.

Likewise, a standard No. 16-16 hobbing machine, with special work slide, hydraulic holding equipment, cam vertical feed and special cutter slide replacing the conventional hob slide, is arranged for internal thread milling the ball nut mating part.

These jobs are examples of special applications which can be adapted to standard hobbing machine operation through special tooling and machine arrangements.

BUILDERS OF PRECISION GEAR

thread milling the worm

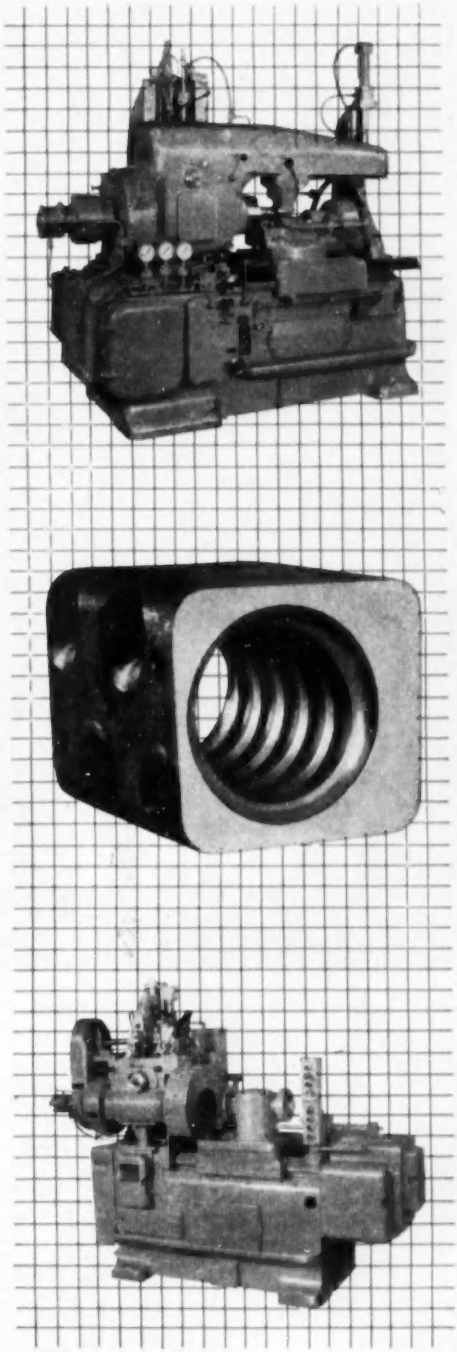
For milling the worm threads, the hob slide is equipped with a thread milling cutter and is positioned 90° from standard, so that the cutter spindle is parallel with the work spindle. The gear train has been modified so that feed and index gears advance the cutter properly to cut the worm threads. The work center bracket support has been designed to provide maximum rigidity of the work piece during the cutting operation. Vertical feed is used to plunge cut to depth, and then the cutter is fed axially to finish the thread.

milling internal threads on the mating part

The machine used to mill the internal threads on the mating part is a special No. 16-16 Hobbing Machine, with special cutter slide positioned permanently so that the cutter spindle is parallel with the work spindle. The gear train has also been modified to advance the cutter in proper relation to the worm threads. Hydraulic holding equipment is employed to clamp the ball nut in position for milling. Clamp and release are operated conveniently by a control valve located on the work slide upright.

Since the No. 16-16 Machine basically does not include vertical feed this arrangement has been added through cam action. A shank-type cutter with special outboard pilot support to steady the cutting action is used, since a small diameter cutter is needed for the internal cut.

When you have problems of producing special forms, equally spaced on a cylindrical base, within the range capacity of standard Barber-Colman hobbing machines, consult our engineers for suggestions on how you may adapt this type of equipment for efficient, economical production. We'll be glad to discuss the adaptation of these machines to meet any of your requirements. Just send us prints or specifications for analysis.



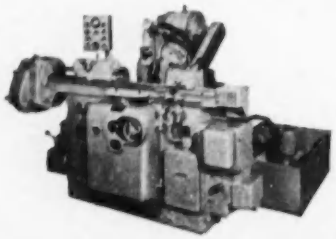
HOBS • CUTTERS • REAMERS
HOBBING MACHINES
HOB SHARPENING MACHINES

BARBER COLMAN

Barber-Colman Company

GENERAL OFFICES AND PLANT, 6511 ROCK STREET, ROCKFORD, ILLINOIS

HOBS AND MACHINES SINCE 1911



YOUR CHOICE OF 3 METHODS FOR ACQUIRING NEW MACHINE TOOLS ON A SOUND BASIS

Jones & Lamson Machine Company now offers a 3-way marketing service to users of high-efficiency metal-cutting tools. This service, initiated by J&L after intensive study, covers every need and clears up all confusion on the problem: to lease or not to lease. You may buy outright . . . buy on a 1-to-5 year basis, at interest rates as low as 3¼%*. . . or you may lease on any of 4 variations of a rental plan. Write or phone Jones & Lamson Machine Company for full information and dependable advice.

*(add-on rate)

JONES & LAMSON MACHINE CO.
523 Clinton St., Springfield, Vermont, U.S.A.

UNIVERSAL TURRET LATHES • FAY AUTOMATIC LATHES • AUTOMATIC DOUBLE-END MILLING & CENTERING MACHINES
AUTOMATIC THREAD & FORM GRINDERS • OPTICAL COMPARATORS • AUTOMATIC OPENING THREADING DIES & CHASERS

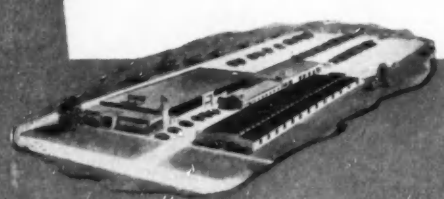
Complete experimental facilities from designing and engineering to finished working models

all under *one* roof

Why is this so important to you and your production plans? It means that your product is designed, developed and produced *in strictest confidence* by *one* family from start to finish. Here in one location, under one roof, is all the modern equipment, all the latest facilities that you need to get your product to market quickly and economically. Here, an experienced staff of skilled technicians works hand-in-hand to complete every phase of your experimental work.

With this kind of organization there's *one* objective, *one* centralized responsibility . . . one accounting. You'll like the way it works. It's one of the reasons why the Wettlaufer organization is a recognized success in the creation and development of working models.

For the right men with the right equipment to market your product, write direct to: E. G. Wettlaufer, President.

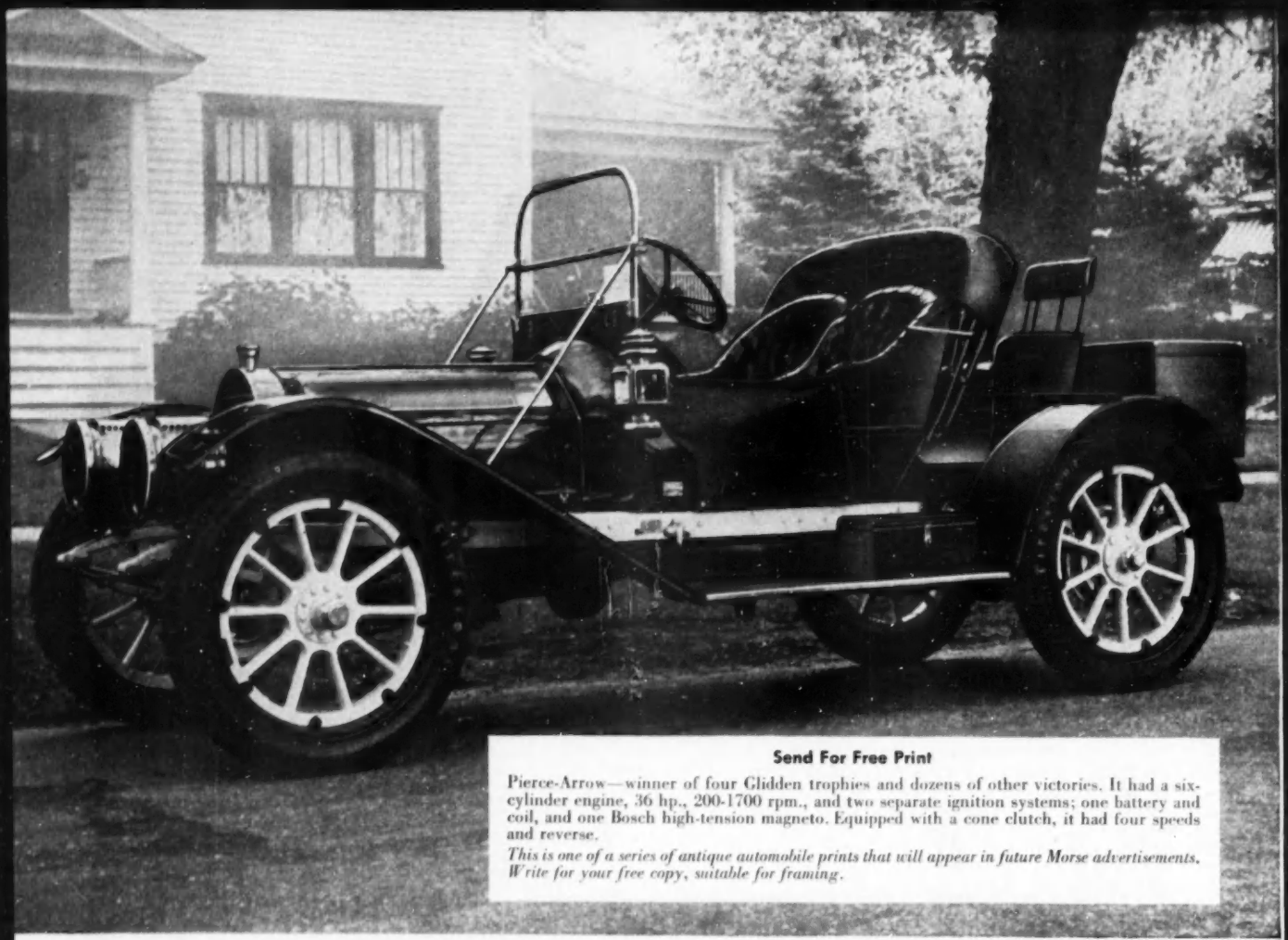


All under one roof... offering complete facilities, from designing and engineering to finished metal working models.

WETTLAUFER

ENGINEERING CORPORATION

19000 W. 8 Mile Rd. • Detroit 19, Mich.



Send For Free Print

Pierce-Arrow—winner of four Glidden trophies and dozens of other victories. It had a six-cylinder engine, 36 hp., 200-1700 rpm., and two separate ignition systems; one battery and coil, and one Bosch high-tension magneto. Equipped with a cone clutch, it had four speeds and reverse.

This is one of a series of antique automobile prints that will appear in future Morse advertisements. Write for your free copy, suitable for framing.

Have you used any of our 58,000,000 timing chain drives?

If you use Morse Timing Chain Drives, you know all about their economy, long service life, and relative freedom from maintenance.

If not, it may pay you handsomely to consider them as original equipment for your cars, trucks or buses. More than 58,000,000 of these drives have been installed in cars and trucks of over 100 different makes.

Whether your engines are in the design, development or application stages, Morse engineering service is available to help you solve your timing chain problems. Call or write us, today.

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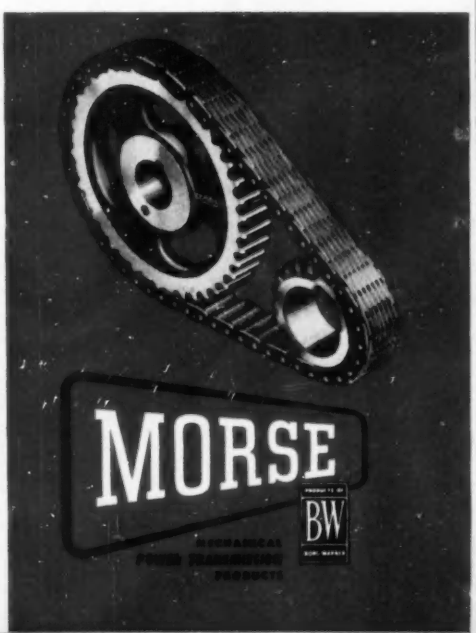
DETROIT 10, MICHIGAN



M=TC

Morse *means* Timing Chains

AC Carburetor Intake Silencers opened the way to whispering engines

Today AC builds over 50% of the industry's needs!

Remember the strange assortment of whistles and roars that marked all automobile engines 25 years ago?

AC was first to tackle the job of quieting them down, with the introduction of the original resonating-type carburetor intake silencer. That was 1930 and a big change was under way. With intake noises hushed, owners (and automobile engineers, too!) became more conscious and critical of other engine noise. An era of quiet was ushered in.

As the pioneer, AC also took the lead in production. Currently, AC produces over 50% of all carburetor intake silencers—each tuned, for maximum effectiveness, to the specific sound frequencies of the engine involved. Without question, in the field of intake silencers, "first and foremost" can mean only AC!

Let AC turn its engineering talent and production skill to your automotive problem. Contact any AC office for fast and thorough action.

For More Than Twenty Years Every Make of Car Has Used One or More AC Products

ADAPTERS (Drive) • **AIR CLEANERS** • **AIR CLEANERS AND SILENCERS** (Combination) • **AMMETERS** • **BREATHERS** (Crankcase) • **CAPS** (Radiator Pressure) • **FLEXIBLE SHAFT ASSEMBLIES** • **FUEL PUMPS** • **FUEL AND VACUUM BOOSTER PUMPS** (Combination) • **FUEL FILTERS & STRAINERS** • **GASOLINE STRAINERS** • **GAUGES—AIR** (Pressure) • **GAUGES—GASOLINE** • **GAUGES—OIL** (Pressure) • **GAUGES TEMPERATURE** (Water, Oil) • **OIL FILTERS** (Lube) • **PANELS** (Instrument) • **RECIPROCATING VACUUM PUMPS** • **ROTARY VACUUM PUMPS** • **SPARK PLUGS** • **SPEEDOMETERS** • **TACHOMETERS** • **TERMINALS** (Ignition Wire) • **VALVES** (Crankcase Ventilation)

AC QUALITY PRODUCTS

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CHICAGO—Insurance Center Bldg.
DETROIT—General Motors Bldg.

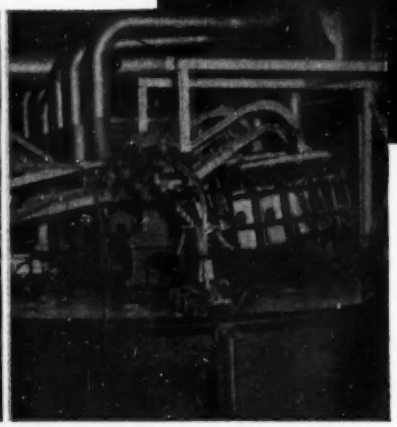
AC SPARK PLUG DIVISION GM GENERAL MOTORS CORPORATION

Automotive Parts and Trim

Produced to your specifications by REYNOLDS

Over 30 Reynolds plants in 18 states assure a steady flow of exterior and interior parts and trim to the automotive industry. Two plants alone have over 200 major pieces of production equipment including 128 presses —mechanical from 2 to 1700 tons and hydraulic from 300 to 5000 tons. *Write for your copy of Reynolds 24-page "Catalog of Facilities."*

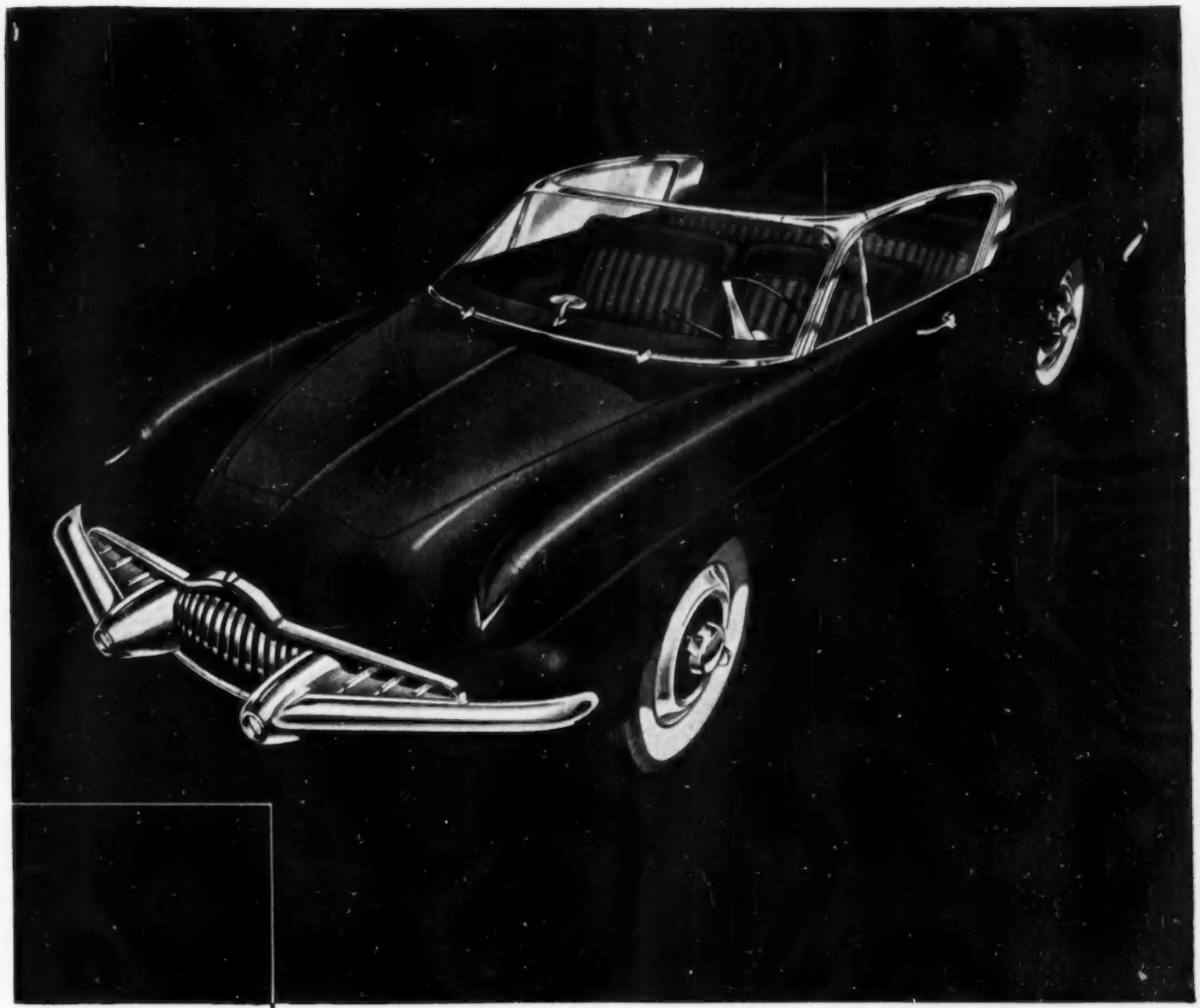
Roll formed aluminum shapes offer important benefits in economy, dimensional accuracy, better finishes and flexibility in design. Moulding strips and other exterior and interior automotive parts and trim can be roll formed by Reynolds to quality standards exceeding industry requirements. *For details, write for new catalog, "Aluminum Roll Formed Shapes by Reynolds."*



Reynolds offers superb facilities, equipment and years of experience in many diversified finishing operations. Reynolds automatic anodizing equipment, for example, assures efficient mass-production of automotive parts and trim to your specifications. Anodized aluminum parts won't rust, are more economical than most plated parts and offer attractiveness without high glare.

REYNOLDS ALUMINUM

BLANKING . EMBOSSING . STAMPING . DRAWING . RIVETING . FORMING



Experienced design and engineering help, superior production facilities and quality control from mine to finished product are three good reasons why it pays to call on Reynolds Aluminum Fabricating Service for your automotive aluminum requirements. On either stock or experimental models, the dual advantages offered by aluminum and Reynolds Aluminum Fabricating Service can help reduce your costs and improve your products.

For full details, contact the Reynolds office listed under "Aluminum" in your classified telephone directory or write Reynolds Aluminum Fabricating Service, 2087 South Ninth Street, Louisville 1, Kentucky.

See "Mister Peepers", starring Wally Cox, Sundays on NBC-TV

FABRICATING SERVICE

ROLL SHAPING · TUBE BENDING · WELDING · BRAZING · FINISHING

for transportation equipment

that stands up...

FLAT-ROLLED STEEL

produced by a specialist

The kids who roll down Oak Hill in a coaster wagon, and those of us who ride in the world's best automobiles, put a lot of faith in flat-rolled steel.

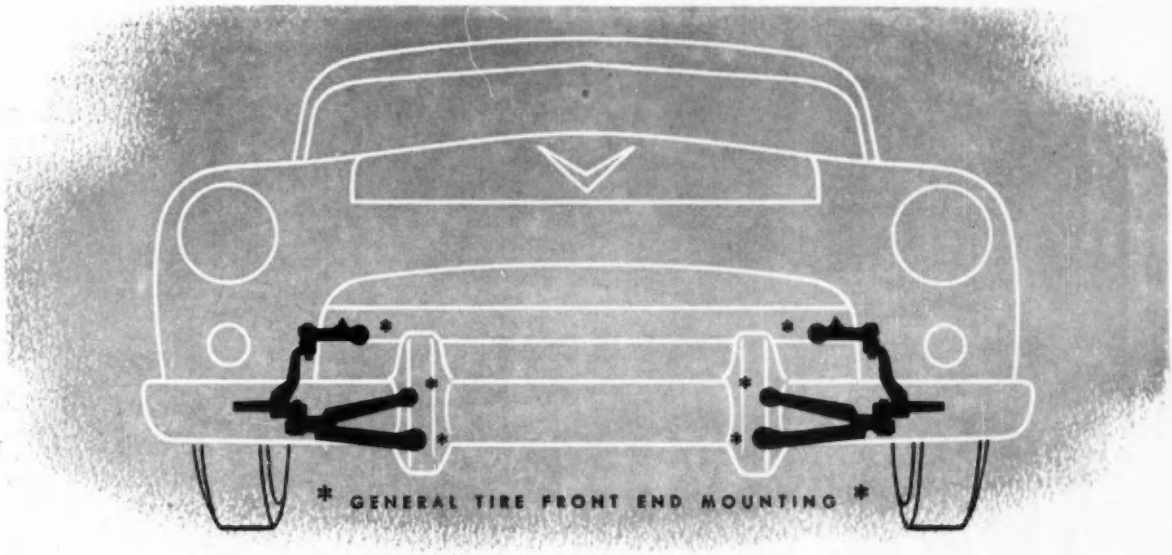
If you use flat-rolled steel in your products, rely on a specialist—Great Lakes Steel. Our entire organization is devoted to the business of making more and better flat-rolled steel for every application. Many manufacturers have found we have some unique qualifications to help them to improve products and reduce costs. We would like the opportunity to work with you on your problems.

Call on our 25 years of specialization in flat-rolled products. Our representative will be glad to discuss your particular needs at your request.

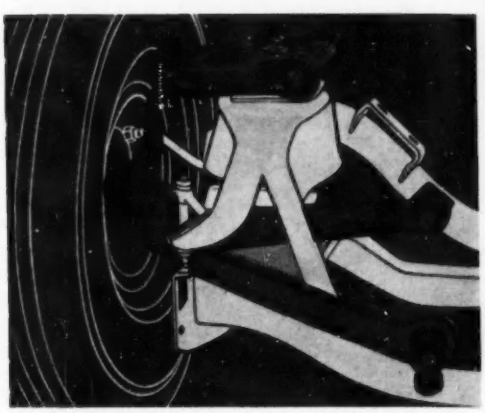
Great Lakes Steel
Ecorse, Detroit 29, Michigan
PRODUCER OF N-A-X HIGH-TENSILE STEEL

UNIT OF NATIONAL STEEL CORPORATION

SALES OFFICES IN CHICAGO, CLEVELAND, GRAND RAPIDS, INDIANAPOLIS, LANSING, NEW YORK AND PHILADELPHIA



Here's* Why Millions Are Driving without the Shakes!



Typical front end suspension showing applications of General's Silentbloc mountings.

Front end Silentbloc mountings developed by General's engineers for leading automotive manufacturers give autos a two-way stretch . . . allow them to float over chuck-holes and insulate passengers from bumps.

This is just another example of the hundreds of successful automotive products that have grown out of General's custom design and production service. We work in extruded rubber and plastic, molded rubber and fiberglas, rubber-to-metal parts, metal stampings, vibration and shock units, and panel mounts. We'll design and produce to your specification.

Why not check into our successful record in the automotive and aviation fields? Just fill out the coupon below for complete information.

"From Plans to Products in Plastics and Rubber"

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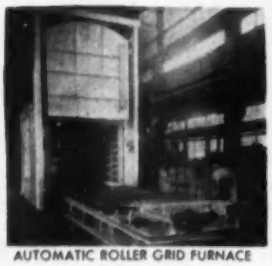
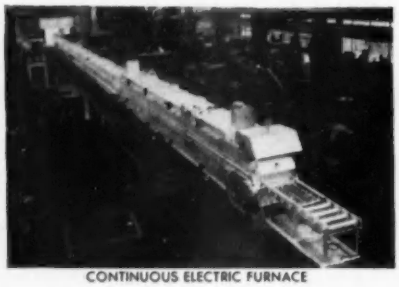
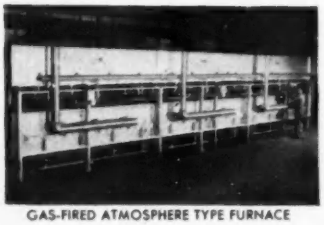


AUTOMATIC ROLLER GRID FURNACE

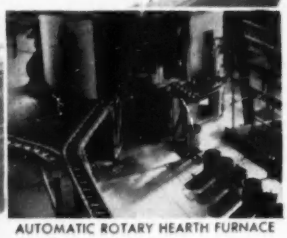


CONTINUOUS ELECTRIC FURNACE



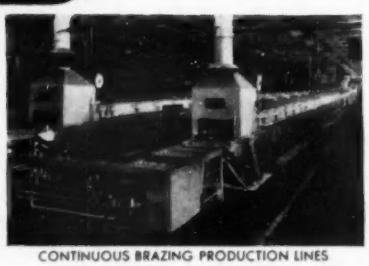
GAS-FIRED ATMOSPHERE TYPE FURNACE

BIG ONES

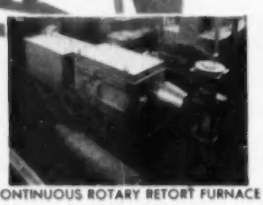


AUTOMATIC ROTARY HEARTH FURNACE

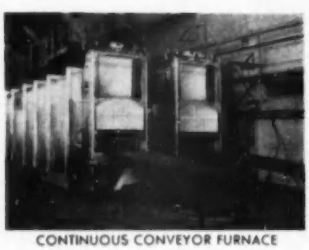
ALUMINUM BILLET HEATER



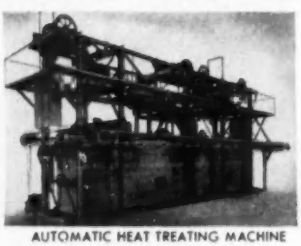
CONTINUOUS BRAZING PRODUCTION LINES



CONTINUOUS ROTARY RETORT FURNACE



CONTINUOUS CONVEYOR FURNACE



AUTOMATIC HEAT TREATING MACHINE

CONTINUOUS VITREOUS ENAMELING LINE

. . . all field-erected by Lindberg

Maybe you haven't heard the news. Lindberg is now set up to field-erect any type of industrial heating or processing installation. Here are just a few of the large field-erected installations already put up by Lindberg. More are being built right now.

You get a complete package deal from Lindberg. Expert engineers consult with you and analyze your needs. Then they plan and design an installation to meet your specific requirements, whether you need a single furnace or a complete production line. And Lindberg will build it for you, right in your own plant.

To get on-the-spot service from an expert Lindberg engineer, just call your nearest Lindberg Field Office (you'll find the number in the classified section of your phone book, or in the Trade Directories).

LINDBERG INDUSTRIAL

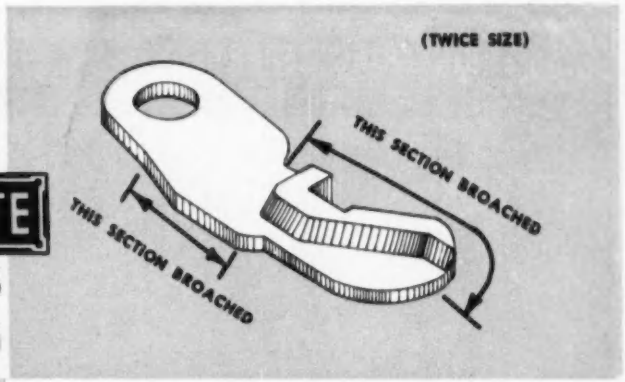
LINDBERG INDUSTRIAL CORPORATION

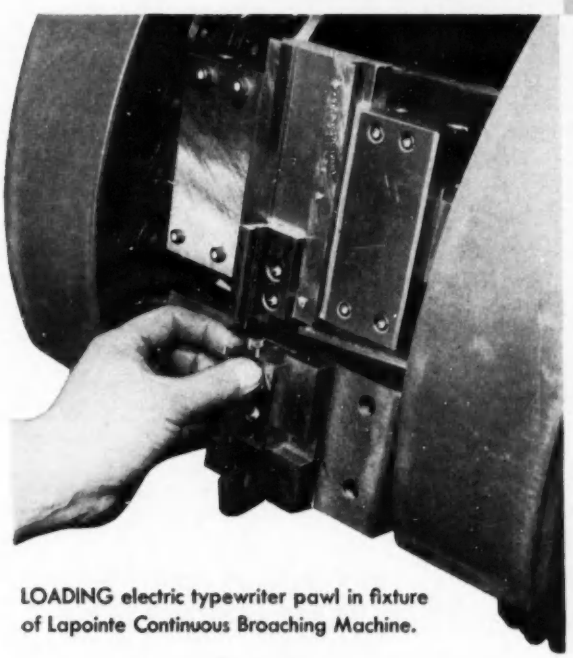
Chicago Plant: 2321 West Hubbard Street, Chicago, Illinois

Los Angeles Plant: 11937 Regentview Avenue, at Downey, California

Field Offices in principal cities. **Associate Companies:** Lindberg Engineering Company, Chicago • EFCO-Lindberg, Ltd., Montreal • Lindberg Italiana, Milan, Italy

here's a good example of what can be done by LAPOINTE CONTINUOUS BROACHING





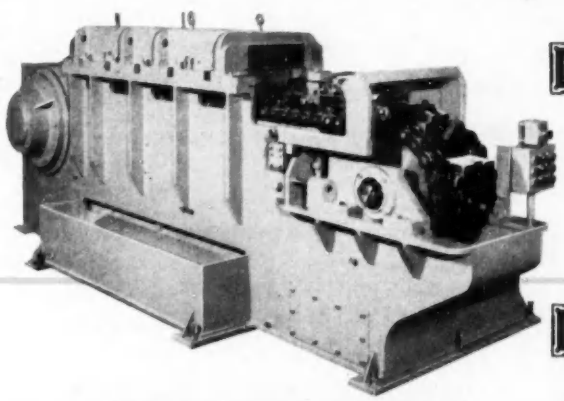
LOADING electric typewriter pawl in fixture of Lapointe Continuous Broaching Machine.

electric typewriter pawl

Contours broached on opposite sides simultaneously, leaving *machined surfaces* of fine finish . . . and to precision tolerances . . . *at a production rate of 800 and more per hour!* This is high production for so small a part, so awkward to load.

THINK of the parts, small or large, that you may now be machining by less economical methods. Then send for the new Lapointe **Bulletin CH-10** and learn more about the superior features of the Lapointe Continuous Broaching Machine. Here are a few:

- Massive, sturdy construction.
- Extra rigidity results in remarkably smooth operation, with no evidence of vibration.
- Full electric interlock instantly stops machine if parts are improperly loaded or clamped.
- Shear pin will sever and protect tools if undue strain develops, or if any other evidence of malfunctioning appears. (Pin is easily accessible, on outside of machine.)
- Drive sprockets are made in pie-shaped segments, removable one at a time, making complete replacement possible — if necessary — without removing drive chain or fixtures from the machine.



LAPOINTE **CONTINUOUS BROACHING MACHINE**
Available in 4 standard sizes
10 hp. 42-inch stroke
20 hp. 66-inch stroke
30 hp. 90-inch stroke
40 hp. 120-inch stroke

Any desired combination of horsepower, stroke, and speed can be obtained.

LAPOINTE **BUILDS THE MACHINE**
BUILDS THE FIXTURES
AND MAKES THE TOOLS

Lapointe takes *all* the responsibility for your CONTINUOUS BROACHING program!

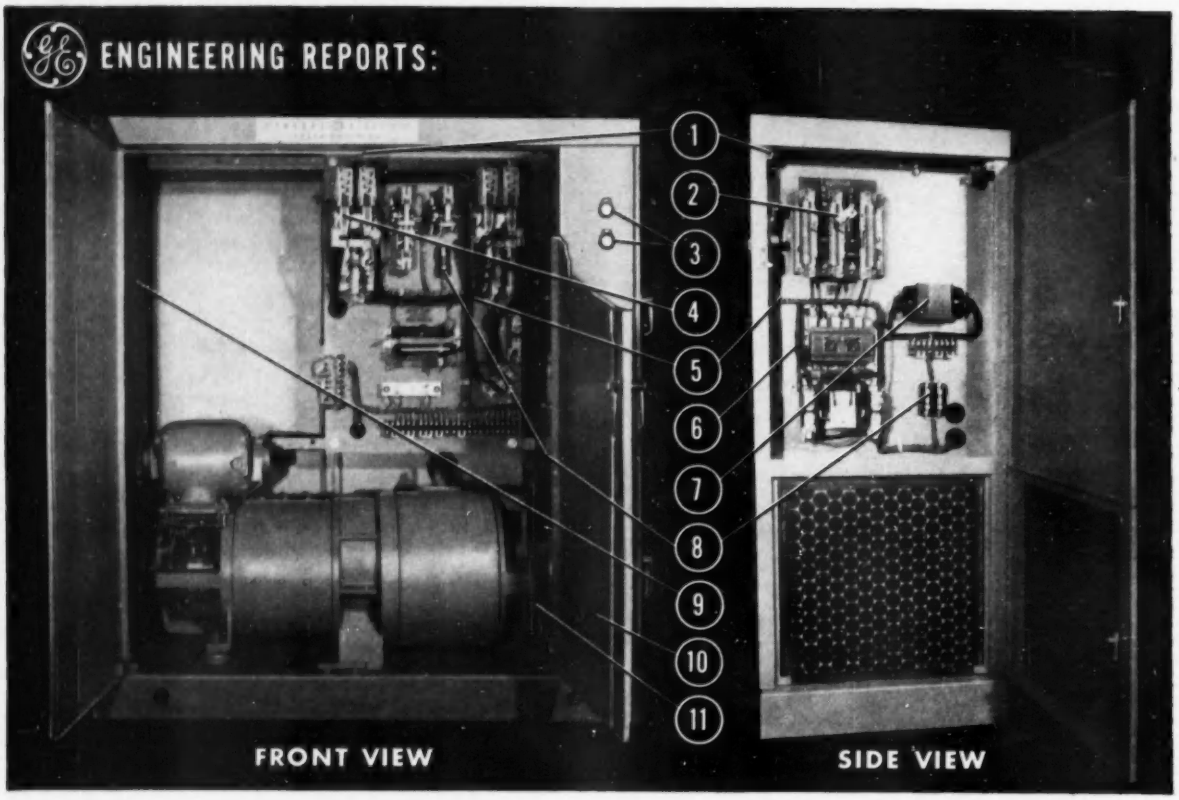
THE LAPOINTE MACHINE TOOL COMPANY

HUDSON, MASSACHUSETTS • U. S. A.

In England: Watford, Hertfordshire

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES

ENGINEERING REPORTS:



New G-E Speed Variator drive designed to meet J.I.C. standards

Designed especially for the automotive industry, General Electric's new Speed Variator is built to meet all applicable Joint Industry Conference electrical standards. This adjustable-voltage d-c drive operating from a-c power provides precise speed adjustment of a d-c motor over a wide range. A power unit with motor-generator set and control panel, (shown above), a d-c drive motor, and an operator's control station are included in the drive. Here are some of the features of the J.I.C. model:

1. **Doors mechanically interlocked with disconnect switch . . . provides added safety for personnel**
2. **Fusible disconnect switch to isolate unit from power source**
3. **Oil-tight start-stop push-button units**
4. **Standard control components throughout**
5. **Color coded and labeled wiring**
6. **A-c undervoltage protection**
7. **110-volt control power transformer**
8. **Control circuit fusing**
9. **Metal diagram pocket inside enclosure**
10. **Hinged double doors (front and back) for easy accessibility . . . are readily removed**
11. **Pressurized cabinet excludes dust and dirt**

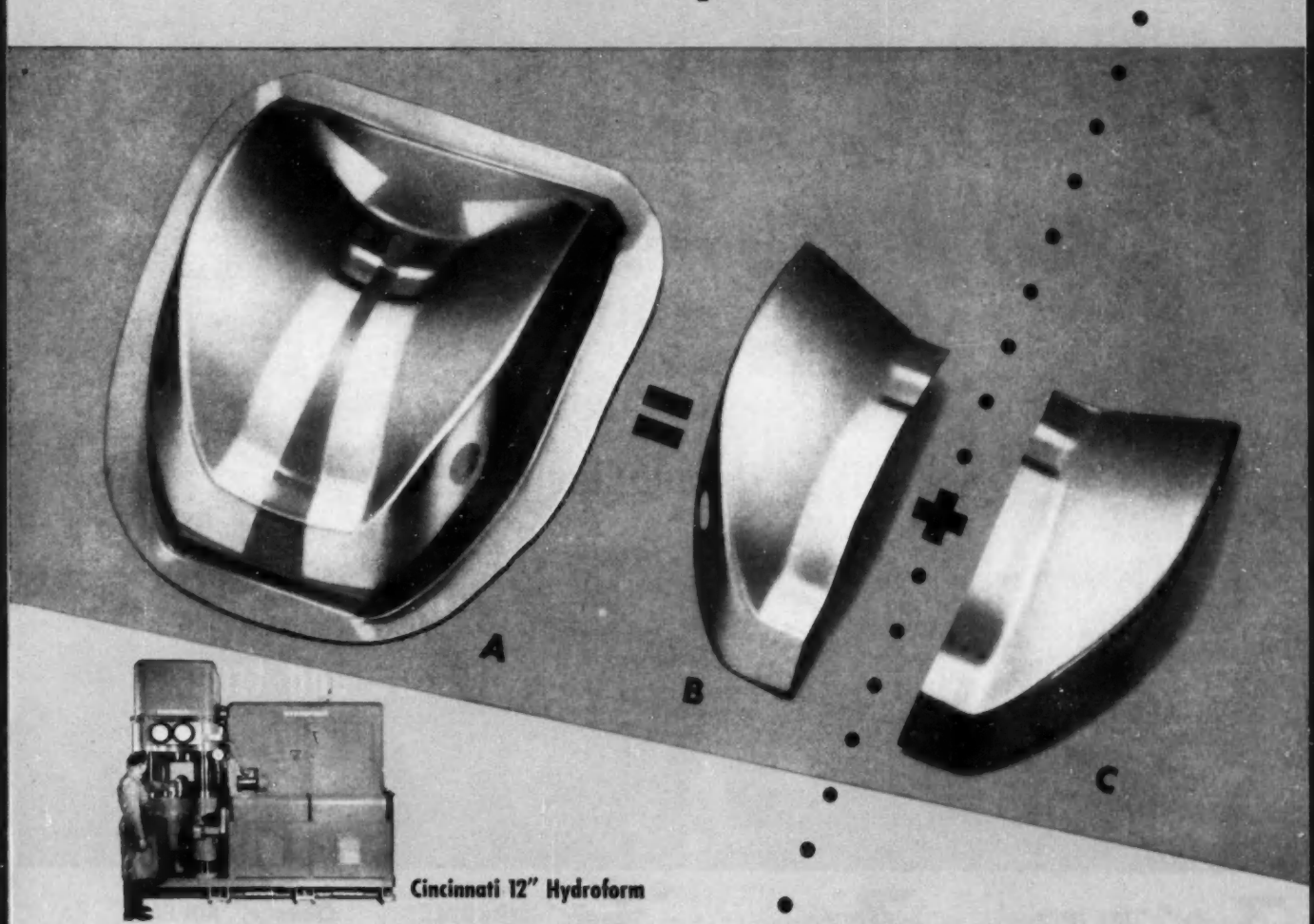
All devices are identified

For more information see your local General Electric Apparatus Sales representative, or write for Bulletin GEA-6000 and GEA-6127 to General Electric Co., Section 651-6, Schenectady 5, N. Y.

Engineered Electrical Systems for the Automotive Industry

GENERAL ELECTRIC

Tricky automotive part gets the Hydroform treatment



Cincinnati 12" Hydroform

With the help of the Cincinnati Hydroform, a supplier to the automobile industry has greatly simplified his production of complex-curved, right-hand and left-hand body structural components.

In the example illustrated above, shape "A" was accurately developed, then readily drawn on a 12″ Hydroform from a 10¾″ dia. blank of 20 gage cold rolled steel. (Note the extreme variations in contours.) Parts "B" and "C" were produced simply by sawing the parts out of the drawn shape. Shape "A" has been masked and paint sprayed, forming guide lines for sawing.

Tool costs were exceptionally low. The Hydroform punch was cast to shape in Kirksite. The draw ring was made from ordinary steel, with a band-sawed opening for the punch.

A similar Hydroforming procedure to that described above is being used successfully, with very substantial time and tool-cost savings, for the forming of duct sections for jet engines from heat-resisting materials.

Have you fully investigated the many Hydroforming advantages . . . and if Hydroforming can be profitably applied to your work? Let a Cincinnati Milling field engineer give you complete information. For a description of the Hydroforming process and specifications of the 8″, 12″, 19″, 23″, 26″ and 32″ machine sizes, write for Bulletin M-1759-3.

Hydroform

PROCESS MACHINERY DIVISION

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

CINCINNATI

Bendix power

STEERING AND BRAKING

sells more cars

satisfies more customers

Today's most wanted power features for cars and trucks

Bendix * low pedal POWER brake

Specified by more car manufacturers than any other make, Bendix Low Pedal Power Brake makes possible quick, sure stops by merely pivoting the foot from stop-and-go controls. No need to lift the foot and exert leg power to bring the car to a stop. Result—more driving comfort, less fatigue and greater safety!

Bendix * POWER steering

Because Bendix Power Steering is of the linkage type, vehicle manufacturers find it especially adaptable for production line installation, without extensive engineering changes. Manufacturers can now meet the increasing demand for power steering more efficiently and more economically with Bendix Power Steering.

Bendix HYDROVAC* POWER brake

With over four million in use, the Bendix Hydrovac is by all odds the world's most widely used power brake for commercial vehicles. This overwhelming preference for Hydrovac is a result of sound engineering design, exceptional performance, low original cost and minimum service upkeep.

Bendix AIR-PAK* POWER brake

With one simple compact unit, Bendix Air-Pak combines all of the well-proven advantages of hydraulic brake actuation with an air brake system. An important advantage of Air-Pak is that brakes can be applied by foot power alone when braking is required before air pressure builds up or if it should fail for any reason.

*REG. U.S. PAT. OFF.

The term "Bendix Power" not only identifies the industry's outstanding power braking and power steering equipment, but describes the unmatched engineering and manufacturing resources behind these products.

It is well that Bendix Products Division be thought of in this dual capacity, for the outstanding acceptance of Bendix power units stems largely from the fact that industry has learned over the years to look to Bendix for the latest and best in power equipment for cars, trucks and buses.

Bendix Products Division

BENDIX PRODUCTS DIVISION SOUTH BEND INDIANA

Bendix AVIATION CORPORATION

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High Spots of This Issue

★ **1955 Lincoln Features New Automatic Transmission**

Breaking away from usage of the traditional Hydra-Matic unit, Lincoln now has its own new Turbo-Drive transmission. Also offered in next year's models are a redesigned V-8 engine and several changes in styling appearance. See Page 48.

★ **Buick Introduces Variable Pitch Dynaflow**

Perhaps the most notable mechanical feature in the Buick line for 1955 is a new version of the Dynaflow drive. It incorporates a stator assembly with variable pitch blading that provides better efficiency and performance. Page 50.

★ **Plymouth Adopts V-8 Engine and Other Advancements**

Tooled up at a cost running into millions of dollars, the 1955 Plymouth is a new car from the tires up. An entirely fresh concept of styling is coupled with new bodies, V-8 engine, improved chassis, and many optional features. Page 52.

★ **Transmission Automation With Power-and-Free Conveyors**

Calling on its wealth of experience as a pioneer in the field, Ford has installed a masterfully planned automation system in its Livonia, Mich., plant. Operation of the power-and-free conveyors is described here. Page 64.

★ **Aircraft Production at De Havilland Canadian Plant**

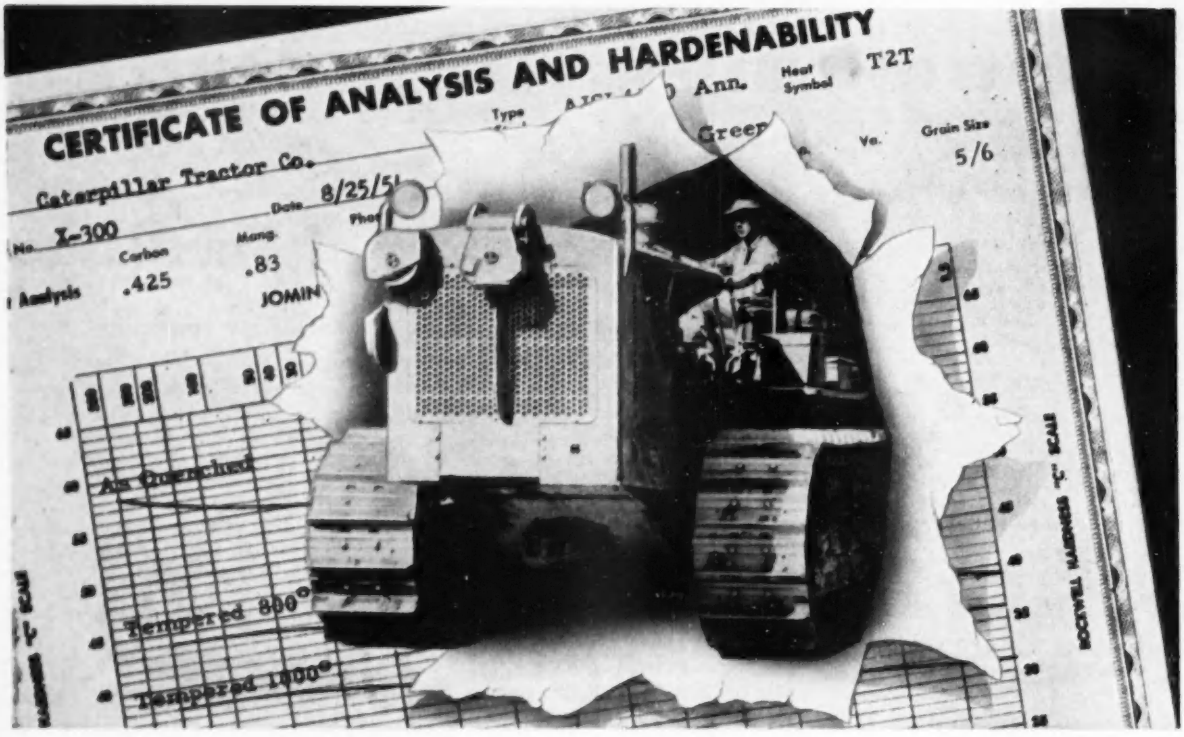
While laying claim to being the oldest of the major aircraft companies in Canada, De Havilland has been right up-to-date in developing new facilities and manufacturing techniques. This article surveys its new Toronto plant. Page 70.

★ **44 New Product Items**
And Other High Spots, Such As

New Dodge, De Soto, Mercury, Oldsmobile, Chrysler, Cadillac offerings for 1955; Ford cars and trucks; increase of 3.6 per cent in 1954 vehicle registrations; experimental tractor engine; new process for sheet metal part passages; AIEE conference; National Metal Show review; GM, Ford price increases; and electronic control for car assembly.

Automotive and Aviation News, Page 33
Complete Table of Contents, Page 3

AUTOMOTIVE INDUSTRIES COVERS
PASSENGER CARS • TRUCKS • BUSES • AIRCRAFT • TRACTORS • ENGINES • BODIES • TRAILERS • ROAD MACHINERY • FARM MACHINERY • PARTS AND COMPONENTS • ACCESSORIES • PRODUCTION EQUIPMENT SERVICE EQUIPMENT • MAINTENANCE EQUIPMENT
ENGINEERING • PRODUCTION • MANAGEMENT



Caterpillar® quality control inspires Ryerson certification

It was 1935—Caterpillar pioneering in quality control—was concerned about the uniform quality of alloy steels from warehouse stock.

Ryerson wished to serve its customers in the best possible manner. We sent our metallurgists to Caterpillar and asked them what could be done that wasn't being done.

Caterpillar pointed out that in the heat treatment of parts there can be as much difference in behavior between two mill heats of the *same* type composition as between two heats of *different* type composition. To emphasize this fact, they cited a statement in the AISI Manual that it would be false and misleading to assume all steels of a given composition are the same.

Ryerson accepted the challenge and began laying the groundwork for a quality control program which would include—1. selecting mill heats, 2. spark testing and carefully segregating every heat, 3. identifying each heat by heat symbol, 4. color marking for AISI number, 5. testing for hardenability in our own laboratory, 6. interpreting hardenability, 7. final inspection before shipment, 8. furnishing Certificate of analysis and guide to heat treatment.

After two years of preparation—we announced the Ryerson Certified Alloy Steel Plan in 1937. And now—not only Caterpillar but all other alloy steel users can buy high uniform quality alloys from Ryerson warehouse stocks with complete confidence. The plan takes time and money but has been helpful to Caterpillar—and we believe—even more helpful to companies without the elaborate testing facilities of Caterpillar Tractor Co.

It just happens that Ryerson is one of four companies that have been serving Caterpillar since their founding—so we are particularly happy to tell this story of progress in quality control—inspired by Caterpillar on this, their 50th anniversary of service to America and to the world.

Principal products: Bars, structurals, plates, sheets, tubing, alloys, stainless, reinforcing, machinery, & tools, etc.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 111, No. 10 **November 15, 1954**

AMC Creates Four Divisions In New Reorganization Plan

Reorganization of American Motors Corp. under its new president, George Romney, has resulted in creation of four new autonomous manufacturing and marketing divisions. The previous Nash and Hudson divisions of the company will operate strictly as independent sales divisions with procurement and production of Nash and Hudson cars handled by a new Automotive Div. under the supervision of Romney.

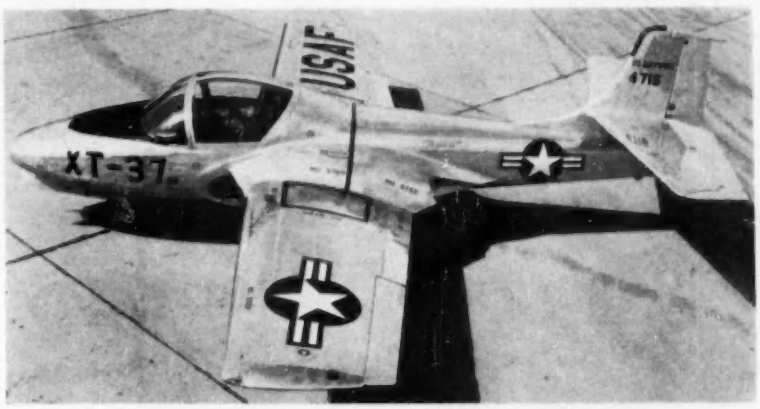
Hudson Special Products Div. has been established to handle defense work and to develop its position as a supplier of automotive and appliance parts to the other AM divisions and to outside automotive companies. Other new divisions are the Appliance and Export and Subsidiaries Divs.

The Appliance Div. will handle all research, manufacturing, and sales functions for the company's complete line of appliances. The Export and Subsidiaries Div. will be responsible for international sales and manufacturing operations in foreign countries of appliances, special products, and Hudson and Nash cars.

The new Automotive Div. will produce Nash and Hudson cars on a common tooling basis at the former Nash facilities in Wisconsin. It is expected that integration of the two lines will save $15 million to $18 million in costs in the first year of operation.

1955 GM Motorama Set for January

General Motors will kick off its 1955 series of Motorama showings around the country in mid-January at the Waldorf Hotel in New York City. GM is said to be thoroughly sold on the appeal value of the Motorama.



EARLY JET INTRODUCTION FOR TRAINEES

The Air Force's newest jet trainer, the XT-37, was designed to introduce the pilot to jet aircraft at an earlier phase in the training cycle. Developed and built by Cessna Aircraft Co., the all-metal plane is powered by two Continental J-69 turbojet engines at speeds in excess of 350 mph. Wing span of the aircraft runs 33 ft.

Army Truck Contract Is Awarded to Reo

A new contract calling for production of M-36 trucks has been awarded to Reo Motors, Inc. Valued at $984,283, the new assignment brings the total of Reo's unfilled military orders to about $6 million.

Ford Has High Hopes Of Taking Lead Spot

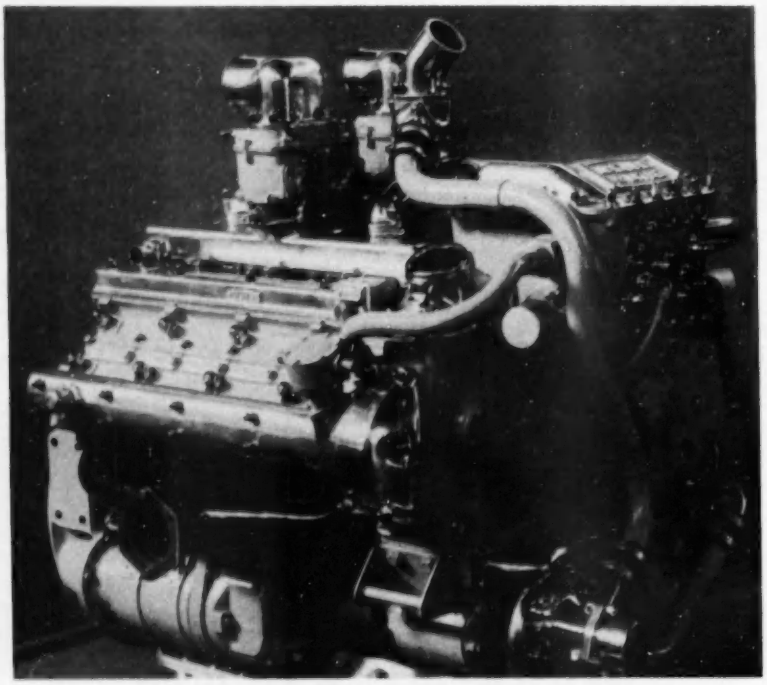
The production battle between Ford and Chevrolet this year is seen in some quarters as just a warm-up for a bigger scrap to come next year. Each is confident that it will outdo the other in final production figures for 1954, and both are getting in shape for what looks like a most decisive year ahead.

Henry Ford II expressed confidence that his company would wind up on top this year at a recent press preview of the company's 1955 line of cars. What the outcome will be, though, is anybody's guess. The production margin between the two car companies has been only about 2000 units in the last several weeks, and Chevrolet has been ahead in most instances. If Ford does take the lead this year, it will be the first time it will have been able to do so since 1935, when it lost the first place to Chevrolet.

Ford car production for the first nine months this year was about 30 per cent over that of last year. The company hopes to produce 12 per cent more cars in the first quarter of 1955 than it did in the same period this year.

Stating that dealers themselves were prepared for the hot competitive battle, Mr. Ford said that the division's dealers so far this year earned a return of 24 per cent on their assets before taxes, and that only eight per cent of them lost money. He declined to predict what the total market would be next year.

News of the AUTOMOTIVE



JAGUAR ENGINE FOR MILITARY MACHINES

Designed principally for armored military vehicles, this new V-8 non-supercharged gasoline engine, built by Jaguar Cars, Ltd., develops 320 bhp at 3750 rpm. Cylinders are set at 90 deg, while a bore and stroke of 4.50 in. and 4.33 in., respectively, give a total piston displacement of 550 cu in. There are two inlet and two exhaust valves per cylinder, and four overhead camshafts. This powerpl' has been completely sealed and waterproofed for operation under all kinds of conditions.

Hendey Becomes Part Of Barber-Colman Co.

Manufacturing rights of Hendey Machine Co., Torrington, Conn., have been purchased by Barber-Colman Co., Rockford, Ill. Hendey will operate as a division of Barber-Colman, which will expand its plant and continue to manufacture Hendey's line of products. Hendey's land and buildings were bought recently by American Brass Co.

"Safe Driving Day" Aimed At Cutting Traffic Toll

Several interesting facts are revealed in President Eisenhower's "Safe Driving Day" program which will be launched on Dec. 15. Purpose of the program is to show motorists and pedestrians how they themselves can eliminate accidents. All states will be asked to join in the demonstration, which is designed to give stimulus to existing safety programs.

In addition to urging motorists and pedestrians to accept full personal responsibility in abiding by basic safety principles, the program will hammer away at the heavy price of traffic accidents. Last year, for example, traffic accidents killed one person on the average of every 14 minutes, for a death toll exceeding 38,000. One person was injured in traffic every 23 seconds.

The 10 million traffic accidents in 1953 cost approximately $4 billion, including medical expenses, property loss, and other costs, nearly five times as much as all fire losses. It is estimated that there will be 85 million vehicles operating by 1975, so the mileage death rate will have to be cut from 7.1 to 4.5 to be able to hold fatalities to last year's 38,800 total.

Ford Assets Top $1 Billion For Seventh Straight Year

The report listing Ford assets for 1953 is of special interest in view of the fact that the company may soon offer its stock for sale to the public. Filed with the Massachusetts Tax Commission, the report shows that Ford assets have exceeded $1 billion for the seventh straight year. They total a record $1.895 billion, compared with $1.757 billion in the preceding year. Surplus retained for use in the business totaled $921.334 million, against $811.199 million in 1952.

The Massachusetts report is the only information available on the company's financial status, since the company is owned by the Ford family and Ford Foundation, which keep profits a secret. The financial statement is mandatory under Massachusetts law.

The report for Dec. 31, 1953 shows the company's cash, receivables, and securities totaled $461.171 million, compared with $540.455 million in 1952; real estate, machinery, equipment and furniture—$870.636 million, compared with $801.234 million; commercial inventories—$448.493 million, compared with $307.023 million; prepaid insurance, interest, and taxes—$35.621 million, compared with $31.292 million; and defense contract costs (net of U. S. government partial payments)—$79.213 million, compared with $77.746 million.

In addition, the report shows liabilities at $419.930 million, compared with $387.678 million in 1952; reserves—$36.605 million, compared with $41.608 million; and capital stock—$17.265 million, same as for 1952; and capital account in excess of par value of stock—$500 million, also same as in 1952.

Ford Thunderbird Offers Two Horsepower Ratings

Ford Motor Co. has disclosed that the engine in its new Thunderbird car is rated at 198 hp equipped with Fordomatic drive, and at 190 hp equipped with standard or overdrive transmission. Compression ratios are 8.5 to 1 with Fordomatic and 8.1 to 1 with standard transmission.

AND AVIATION INDUSTRIES

GM Profits Increase In First Nine Months

Despite a drop in total civilian and defense business and lower car production, net earnings of General Motors Corp. for the first nine months increased to $585 million. This figure was about $132 million over that for the same period last year.

The higher income was attributed primarily to lower taxes. GM in the nine-month period paid out only $614 million in taxes, compared with $1.006 billion in the corresponding months of 1953.

Extra Dividend; Sales Down

As a result of the higher profits, GM directors declared a year-end dividend of $2 on the common stock. Total payments this year thus amount to $5 a share, compared to $4 in 1953 when quarterly payments of $1 were made. Furthermore, the $2 declaration should boost total GM dividend disbursements in 1954 to $436 million.

Sales, including civilian and defense volume, amounted to a total of $7.219 billion and were nine per cent short of the record sales of $7.931 billion for the first nine months of last year. In the third quarter, total sales dropped to $2.153 billion from $2.490 billion in the same three months of 1953.

GM's sales of defense goods in the first nine months of this year were 24 per cent lower than the like 1953 period, dropping from $1.398 billion to $1.058 billion. The company's current defense production represents about 15 per cent of total sales, against 20 per cent in the two preceding years.

Sales Abroad Up; Employment Off

While the company's U. S. vehicle production is behind last year, the company's overseas plants continue to turn in a good showing. Total sales of 252,689 cars and trucks by GM's plants abroad, which are currently undergoing expansion, were up 36 per cent over last year's nine-month period. In the U. S. and Canada, GM produced 2,600,469 cars and trucks in the first nine months of this year, against 2,849,681 last year, for a nine per cent decline. Truck output alone was down about 21 per cent.

On the employment front, GM reports that its payroll during the first nine months totaled $1.887 billion, against $2.009 billion for the same period last year. The average number of workers employed by GM during this period was 538,493, compared with 557,261 in 1953.

The declines were attributed to the drop in defense orders. Employment on defense production at GM dropped to 55,000 in the third quarter from a peak of nearly 95,000 in mid-1953.

LOW OCTOBER OUTPUT REFLECTS CHANGEOVER PERIOD

1954 Passenger Car Production

As reported to Automotive Industries by the car factories

	October 1954	September 1954	October 1953	Ten Months 1954	Ten Months 1953
Chrysler	4,998	None	12,356	71,775	137,811
De Soto	2,936	None	7,715	46,619	108,127
Dodge	8,265	113	25,918	94,134	259,908
Plymouth	14,868	1,861	67,640	277,299	565,169
Total—Chrysler Group	31,067	1,974	113,629	492,027	1,071,015
Ford	30,419	114,143	132,115	1,130,538	1,011,495
Lincoln	1,227	2,345	39	30,930	35,195
Mercury	9,906	21,848	37,077	221,010	270,063
Total—Ford Group	41,552	138,336	169,231	1,382,478	1,316,753
Buick	14,637	41,615	41,792	439,680	453,827
Cadillac	3,370	10,674	7,095	97,484	89,742
Chevrolet	72,433	37,680	132,955	1,126,170	1,312,029
Oldsmobile	20,968	34,907	14,408	354,101	264,487
Pontiac	31,780	4,238	31,343	285,735	362,277
Total—G. M. Group	143,188	129,124	227,593	2,294,180	2,502,362
Hudson	3,470	3,517	4,150	28,907	67,562
Nash	5,780	5,940	7,699	57,337	119,883
Total—American Motors	9,250	9,457	11,849	86,344	187,445
Henry J			216		6,386
Kaiser	None	None	76	5,409	19,324
Willys	243	380	2,288	9,737	42,770
Total—Kaiser Motors	243	380	2,580	15,146	68,480
Packard	None	1,322	446	25,250	75,227
Studebaker	11,327	5,114	5,437	37,981	161,692
Total—S-P Corp.	11,327	6,436	5,883	63,131	236,919
Total—All Makes	236,627	285,707	530,764	4,332,306	5,382,954

Austria Relaxes Curbs On Imported U. S. Cars

Relaxing of curbs on imports of American cars by Austria is expected to broaden the automobile market in that country appreciably. Under the new setup, Austrian importers will not be required to have a license for bringing in cars from the U. S. It is the first time that country has eased its import laws since WW II.

Ford Acquires White Plant In Montreal; Office Moved

Ford Motor Co. of Canada, Ltd., has purchased the Montreal plant of White Motor Co. of Canada, Ltd., to convert it into an automotive parts and accessories distributing plant for the province of Quebec. The depot will cover 100,000 sq ft of floor space, and eliminates Ford's previous plans to build a depot at Montreal.

White will build a new 200,000 sq ft truck and service headquarters building at Montreal. Site at Montreal for a new White plant has not yet been announced.

In another action, Ford moved its head office to Toronto from Windsor, Ont. The move, which covers senior executives, was made in mid-October in connection with the strike at Ford plants at Windsor and Oakville, Ont.

Windsor will continue to be the principal manufacturing center, where the plants have a combined floor area of more than 65 acres, double the space at the Oakville assembly plant. Each unit will have its own office.

News of the AUTOMOTIVE

FIAT FOR FARM

The new Fiat 55R tractor has been specially constructed for agricultural operations and heavy transportation work. It is powered by a four-cyl, direct - injection Diesel engine with a bore of 122 mm and stroke of 140 mm. Compression ratio is 15.5:1, and maximum output is 55 bhp at 1400 rpm. Wheelbase is seven ft., three in.; length, 11 ft, 11 in.; and width, six ft, five in.

New Action Is Expected In "Bootlegging" Probe

New action in the automobile industry's efforts to curb "bootlegging" can be expected soon. Armed with new evidence, the National Automobile Dealers Association is preparing to proceed with further inquiry and public hearings on the matter.

Backed by the Senate Interstate Commerce subcommittee, which has been investigating "bootlegging," NADA is confident it will be able to get new Congressional action on a bill which would give car manufacturers the right to add an "anti-bootlegging" clause into contract agreements. The bill failed at the last session of Congress.

Rover, Rootes, Ford Plan Expansion of Facilities

Recently reported were the expansion programs of $25 million by the British Motor Corp. and $100 million by Vauxhall. Three other British manufacturers have now followed suit by releasing details of their future investment plans.

Rover is to spend $8.4 million on doubling the output of Land Rovers and increasing total car production by 50 per cent. Target for Land Rovers is 50,000 a year, and 15,000 for other vehicles.

The Rootes Group has raised its figure of planned expenditures to $28 million. This sum will cover the current extension by 50 per cent of floor area in overseas assembly plants, and the equipping of its new factory at Dunstable, England.

Ford of England has also announced a $182 million expansion and modernization program to cover the next five years. In addition to considerable enlargment of its plant at Dagenham, Essex, the company reportedly will erect two new plants at Basildon and Averley, both also in Essex.

Firm Expands Facilities For Production of Axles

Rockwell Spring and Axle Co., which recently shut down its Van Dyke, Mich., plant because of declining orders from automobile manufacturers, will add 340,000 sq ft of floor space to its axle and gear plant in Newark, O. Total outlay for the plant is expected to amount to about $4 million, with half of it to be spent on new equipment. It is scheduled for completion early next year.

Ordnance Testing Vehicles For Atomic Warfare Usage

Army Ordnance officials are placing new emphasis on the design of combat vehicles for atomic warfare. While detailed descriptions are top secret, the Army has been conducting tests on several such vehicles. If field trials are successful, the Army will let production contracts.

Cadillac Raises Sights To 150,000 Cars in 1955

Cadillac, unlike other car manufacturers, will hit a new production and sales record this year. By the end of 1954, the company will have turned out more than 123,000 cars for the calendar year, about 13,000 more than its best previous year, 1951.

Next year, Cadillac plans a new high of 150,000 cars. Reason for the optimistic schedule lies partly in the 90,000 unfilled orders currently on the books.

Cadillac has been preparing for the past year and a half for expanded output and has spent $24 million for facilities, equipment, tools, and machinery. It currently has about five million sq ft of manufacturing area at the home plant in Detroit. In addition, it has acquired another plant in Detroit for defense work and has moved its parts operation into the 600,000 sq ft former Detroit Transmission Div. plant.

These additional facilities will enable Cadillac to bring back to its home plant work which previously had been subcontracted for lack of space. Overtime operations will also be greatly reduced.

In order to hit its current peak production rate, Cadillac has been on overtime of either nine or ten-hour days since the 1954 models were introduced last February. Normal capacity at Cadillac now is 125,000 cars a year, thus indicating some overtime to reach next year's projected 150,000.

Gardner-Denver, Keller Examine Plan To Merge

Shareholders of Gardner - Denver Co., Quincy, Ill., and Keller Tool Co., Grand Haven, Mich., are studying a plan to merge the two companies. Approval of the proposal would give Keller shareholders five-eighths of a share of Gardner-Denver common stock for each of Keller's 451,150 shares of outstanding stock.

Keller holders also would receive an additional 225,000 Gardner-Denver shares. Gardner-Denver last year had sales of $32.877 million, while Keller sales totaled $6.541 million.

AND AVIATION INDUSTRIES

DEATH CLAIMS SHAW

Victim of a plane crash near Decatur, Ind., on Oct. 30 was Wilbur W. Shaw, 52, president of the Indianapolis Motor Speedway. Three-time winner of the 500-mile classic in 1937, 1939, and 1940, he took over leadership of the race track in 1945 and restored it to its pre-war eminence as a citadel of car racing.

Car Cooling Installations May Hit 100,000 This Year

There is no simple way of estimating the installations of air conditioning systems in passenger cars, for no figures are officially reported. However, it is estimated that in 1953 about 28,000 installations were made by the factories, plus 12,000 additional units by independent suppliers.

Gaging 1954 installations is much more speculative, of course. One estimate places the figure somewhere between 60,000 and 90,000 units installed at the factories. It is also calculated that independent suppliers may account for some 20,000 more. Thus, it is possible that close to 100,000 units may be installed.

Presidency of Parts Maker Passes to Seth G. Atwood

Important changes were made recently in the organizational set-up of Atwood Vacuum Machine Co. Seth G. Atwood succeeded his father, Seth B. Atwood, as president, and the latter is now chairman of the board. James T. Atwood, brother of the elder Atwood, has become chairman emeritus.

AI TABLOID

Thew Shovel Co. has acquired control of Dixie Crane & Shovel Co. . . . TelAutograph Corp. has purchased a substantial interest in Nuclear Consultants, Inc. . . . Elgin National Watch Co. has bought Neomatic, Inc.

* * *

Fairchild Engine & Airplane Corp. has formed a Kinetics Div. It will carry on the specialized consulting and plastics research work of Gassner Engineering, recently acquired by Fairchild.

* * *

Federal Fawick Corp. has changed its name to Fawick Corp. . . . Sprague Engineering & Sales Corp. has dropped the "Sales" from its name.

* * *

Westinghouse Electric Corp. is undertaking development of an atomic reactor powerful enough to propel a ship as large as an aircraft carrier.

* * *

New operator of the Government-owned forgings plant at Erie, Pa., is Kaiser Aluminum & Chemical Corp. . . . The Aluminum Association has formed a new division to cover producers of aluminum rolled bar, rod, and wire.

* * *

Malayan Tin Bureau reports that almost 20 per cent more tin was delivered to U. S. industry in 1953 than in 1952.

* * *

Gould-National Batteries has unveiled the prototype of a new electric truck. . . . Libbey-Owens-Ford Glass Co. has developed a new rear-view mirror with a beam-splitting technique.

* * *

Aircraft Transformer Corp. is now making military grade transformers with an encapsulation material based on Du Pont neoprene synthetic rubber.

B. F. Goodrich Co. has announced that it will spend more than $100 million for expansion over the next five years. Major part of the money will be spent on tubeless tire production and distribution facilities.

* * *

The American Medical Association has recommended that domestic car producers equip automobiles with safety belts and provide seats, cushions, and doors to withstand impacts of 10 to 15 G's without injuries.

* * *

The British Fairey Delta-2, a new delta-winged research aircraft, has been successfully test-flown. . . . In 1956, the new 70-passenger 800 Series of the Vickers Viscount turboprop airliner is expected to be in production.

* * *

Northrop Aircraft, Inc., is planning a multi-million dollar expansion program at its main Hawthorne, Calif., plant. . . . North American Aviation, Inc., is erecting new $1.2 million building for jet fighter assembly.

* * *

International Research & Development Corp. has moved to new quarters at 797 Thomas Lane, P. O. Box 1707, Columbus 16, O.

* * *

Lockheed Aircraft Corp.'s contract for C-130A cargo planes has been extended to 1957. . . . Lear, Inc., has received a $3 million contract to turn out the new MB-2 autopilot.

* * *

North American Aviation has announced development of two new electronic devices. One is for calibrating an airplane's natural angle of attack, and the other is for computing the jump angles of rockets and missiles.

(Turn to page 112, please)

News of the AUTOMOTIVE

POWERFUL TANK HIDE PENETRATER

The new 106-mm BAT recoilless rifle for use against tanks permits infantrymen to spot their target with 50-cal tracer bullets and destroy it with a 17½-lb projectile. Manufactured by Firestone Tire & Rubber Co., the 134-in. weapon is either mounted on a quarter-ton truck or on a tripod based on the ground. It reportedly will penetrate armor double the thickness of that on any known tank.

Ford Arizona Proving Ground To Have Five-Mile Oval Track

Ford Motor Co. will add a five-mile, high-speed oval track and two test buildings at its 4000-acre desert proving ground now under construction near Kingman, Ariz. When the test area is completed, it will eventually replace the company's Phoenix base which has been in operation since 1946.

The new three-lane blacktop test track will be banked for speeds up to 140 mph and is scheduled for completion next spring. One of the buildings, a one-story unit containing 20,000 sq ft of floor space, will serve as operational headquarters. The other, a two-story structure covering 6400 sq ft, will house a cafeteria and lounge.

Square D Acquires Cedar Rapids Plant

Acquisition of the Iowa National Mfg. Co., Cedar Rapids, by Square D Co. marks another phase in the company's general expansion program involving expenditures of about $2.5 million in the current fiscal year. Included in the transaction is a 26-acre site and a 112,000 sq ft, partially finished manufacturing plant which Square D plans to complete soon.

To be operated as a wholly-owned subsidiary of Square D, the plant, which formerly sub-contracted work to Square D, will continue to turn out voltage testers and several special products. It will also manufacture several new products which the company expects to announce next year.

Gear Firm Drops Plea For Wage Reductions

Detroit Gear Div. of Borg-Warner Corp. will not appeal its suggestion to the UAW-CIO for a 15 per cent pay cut which was turned down by Local 42 recently. The company's suggestion was sent to 500 employees, asking them also to forego a five-cent annual improvement factor raise due Oct. 30.

In recommending the pay cuts, the company has followed the pattern of Studebaker and Kaiser, where workers took reductions to help bring the company to a more competitive basis in the automobile industry. The present contract between Detroit Gear and the union runs until next September.

SAE Announces Candidates For 1955 Society Officers

The Society of Automotive Engineers has announced nominations for 1955 officers. Ballots, which must be in by Nov. 30, carry the names of the following candidates for the offices given:

President, C. G. A. Rosen; councilors, M. C. Horine, M. P. Jolley and W. G. Nostrand; treasurer, B. B. Bachman; and vice-presidents representing activities — R. Dixon Speas (air transport); J. D. Redding (aircraft); F. E. Carroll, Jr. (aircraft powerplant); H. S. Kaiser (body); F. A. Robbins (Diesel engine); W. Paul Eddy, Jr. (engineering materials); J. F. Kunc, Jr. (fuels and lubricants); R. F. Kohr (passenger car); P. A. Miller (production); Trevor Davidson (tractor and farm machinery); Robert Gardner (transportation and maintenance); and R. C. Norrie (truck and bus).

Lakey Foundry Gets New Gray Iron Work

Packard V-8 heads and blocks, and castings for Kaiser-Willys, previously manufactured by two large independent foundries in Michigan and Ohio, will now be made by Lakey Foundry Corp. Both foundries reportedly have discontinued their gray iron castings operations.

Other work previously done by the two other foundries which Lakey is taking over includes the manufacture of engine parts for Ford and castings for Detroit Diesel and GMC. The new business reportedly will boost the firm's production of gray iron by about 3000 tons a month.

Caterpillar Testing New Crawler Tractor

Extensive testing of what is said to be the largest and most powerful crawler tractor ever built began recently. Presently called the D9X, the new machine is the sixth member of Caterpillar Tractor Co.'s crawler tractor family.

Tentative specifications on the D9X list the machine as 18 ft long, 12 ft wide, and 10 ft high. The bare tractor weighs 51,500 lb, the blade and cable control an additional 11,000 lb.

AND AVIATION INDUSTRIES

Pontiac, Buick Feature AC's New Speedometer

Pontiac and Buick are the first two car makers to adopt AC Spark Plug's new disc-type speedometer on their 1955 models. Known as the "Safety Arc," the unit indicates speed by a continuous curved red line. Since this line lengthens as car speed increases, it reportedly makes a driver more speed conscious.

Turn signal indicators and bright light indicator are incorporated in the new speedometer. Use of non-metallic washers and silicone liquid in the new speedometer are said to reduce noise and vibration.

Swedish Car Maker Offers Free Insurance to Buyers

A motorist in Sweden who buys a new Volvo car and gets it smashed up through no fault of his own can now have the automobile replaced with a new one for just $40. Volvo, the biggest car manufacturer in Sweden, has made that possible through free insurance coverage it is offering to its buyers.

Under the plan, which gives the purchaser coverage for five years, the company will pay for all damages on the car which exceed $40, but "within certain limits." The insurance does not cover damages incurred by a motorist through his own fault. It is interesting to note that Sweden discontinued all taxes on automobiles last year, with the exception of import levies, which may have prompted the Volvo insurance plan.

DeSoto Graduates First Field Force

Designed to strengthen its field forces, DeSoto's new training program recently graduated its first 12 men qualified to become district managers. The men, all carefully selected graduates of universities and colleges, who have been classified as district managers-unassigned since July, will now put their training to test in the field. All have been thoroughly grounded in division and corporation policies and business philosophy, as well as dealer operations.

SEPTEMBER SALES OF 369,942 UNITS LOWEST SINCE 1947

1954 U. S. Motor Vehicle Factory Sales*

	Passenger Cars	Trucks	Buses	Totals 1954	Totals 1953
January	454,562	96,187	405	551,134	584,470
February	446,676	87,141	326	534,143	582,200
March	531,529	101,177	297	633,003	700,439
April	534,667	96,723	379	631,769	722,675
May	497,062	91,226	274	588,562	642,132
June	507,055	91,470	351	598,876	660,131
July	451,663	78,507	246	530,416	702,899
August	445,306	75,835	309	521,450	614,655
September	300,998	68,618	326	369,942	574,631
Total—Nine Months	4,169,518	786,884	2,915	4,959,297	5,784,232

1954 U. S. Motor Truck Factory Sales By GVW*

	5,000 lb. and less	5,001-10,000	10,001-14,000	14,001-16,000	16,001-19,500	19,501-26,000	Over 26,000	Total
January	45,560	17,492	3,608	17,735	3,658	4,786	3,348	96,187
February	39,373	16,210	3,207	15,656	3,915	5,449	3,331	87,141
March	45,588	18,841	3,719	19,446	4,358	5,322	3,903	101,177
April	43,187	18,023	3,755	18,996	4,017	5,074	3,671	96,723
May	41,950	16,895	3,329	16,958	3,812	4,612	3,670	91,226
June	42,786	15,936	3,464	18,021	4,284	3,726	3,253	91,470
July	37,470	13,568	3,289	15,714	3,103	2,430	2,943	78,507
August	35,395	12,744	2,735	15,292	3,986	2,381	3,302	75,835
September	31,752	12,919	2,576	11,984	3,549	2,589	3,249	68,618
Total—9 Mos. 1954	363,061	142,618	29,682	149,802	34,682	36,349	30,670	786,864
Total—9 Mos. 1953	439,271	173,822	37,249	142,842	40,003	71,225	37,476	941,889

*—Automobile Manufacturers Association.

Ford Hourly Employment Dips But Total Payroll Near High

While average hourly employment at Ford Motor Co. was substantially lower during the first nine months of this year than in the same period last year, the total payroll was just four per cent under the all-time high in 1953. There was an average of 126,715 hourly employes at Ford working a median 41.3 hours a week to earn a total of $489.055 million in the first three quarters.

The payroll includes hourly workers from the highest to the lowest classifications in Ford plants throughout the country. A drop of nearly 5000 in average employment at Ford was due primarily to reductions in defense work.

Alfa-Romeo Vehicles Are Made in Brazil

A contract was recently signed between the Fabrica Nacional de Motores S. A. and the Alfa Romeo Co. of Milan (Italy) with respect to technical collaboration for a period of seven years. It is understood that the nationalization of the FEN-Alfa-Romeo D-9500 truck, under the supervision of Brazilian as well as Italian technicians, is already well underway.

It is expected that in 1955 the national percentage of total output will be increased to seventy per cent. Production of the engine is programmed for domestic production in 1956.

Vance Named Winner Of Ordnance Award

At the annual meeting of the American Ordnance Association at the Cincinnati post last month, Harold S. Vance, chairman of the executive committee of Studebaker-Packard Corp., was the guest of honor. He was presented with the Charles L. Harrison Award for Distinguished Ordnance Service.

The citation was read by Frederick V. Geier, president of the Cincinnati Milling Machine Co. Mr. Vance in his remarks, called for a strong military potential as the means of averting World War III.

Continued on Page 104

John Deere chooses New Departure

. . . for the PICK OF THE CROP

Profits up—costs down! John Deere's new No. 1 Cotton Picker does the work of 40 men! But savings aren't confined to labor. For this picker saves *importantly* on upkeep, too. Its 52 New Departure **ball** bearings in 13 locations need no time out for either lubrication or adjustments.

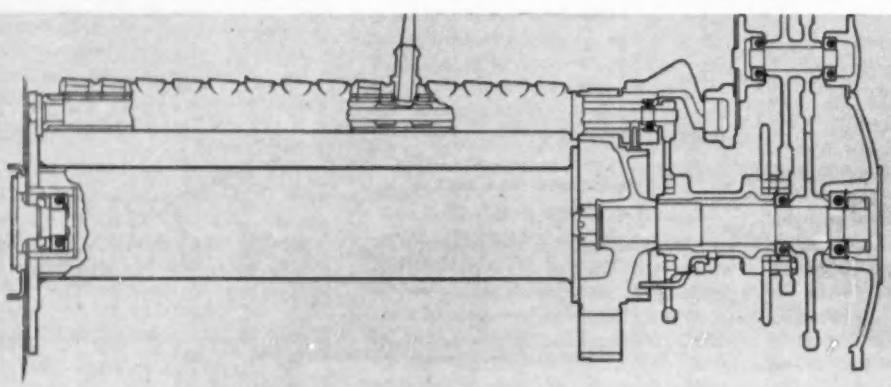
With New Departure **ball** bearings used in so many important positions, positive and accurate location of parts is assured . . . and that means a machine always in top operating condition . . . always ready to do the job *fast* and *right*.

If you're designing for the farm, it will pay you to learn the advantages of New Departure *ball* bearings. Talk with your New Departure engineer about it—*today!*

NOTHING ROLLS LIKE A BALL

NEW DEPARTURE
BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT
Plants also in Meriden, Connecticut, and Sandusky, Ohio
In Canada: McKinnon Industries, Ltd., St. Catharines, Ontario



Cutaway shows six of the 17 New Departure **ball** bearings in the rear picker drum of John Deere's No. 1, One Row Mounted Cotton Picker. These bearings preserve precision alignment, need no upkeep.

Men in the News

Daybrook Hydraulic Div., L. A. Young Spring & Wire Corp. —R. C. Graves has been named director of sales.

American Motors Corp. — **J. L. Brown, Jr.**, was elected vice-president.

Chrysler Corp., Export Div.—**Kenneth E. Thompson** has been appointed general parts manager.

Kaiser Motors Corp. — **Robert J. Jespersen** has been appointed vice-president and controller.

Westinghouse Electric Corp., Sturtevant Div.—**Walter T. Rogers** has been named manager of advertising and sales promotion.

Wisconsin Motor Corp. — **A. F. Milbrath**, chief engineer and vice-president, has retired.

Fellows Gear Shaper Co.—**Frank D. Sanborn** has been named western district manager in charge of the new Los Angeles branch office.

Borg-Warner Corp., Long Mfg. Div. —**T. J. Ault** was elected president and general manager; **J. Rodger Dryden**, chairman of the board; and **Royden Walters**, secretary and treasurer. **J. Lester Dryden, M. J. Brinkman, L. J. Loranger**, and **W. F. Burgess** have retired.

General Motors Acceptance Corp.—**August Freise, Charles P. Fiske**, and **G. Ardee Ames** have been elected executive vice-presidents, while **Gavin Brackenridge, Charles E. Maloney, J. Horace Norweb, John M. Pomeroy, William G. Schick**, and **John B. Wright** have been elected vice-presidents.

Aluminum Industries, Inc. — **Harrison O. Ash** was elected president and general manager.

Chrysler Corp., Marine and Industrial Engine Div.—**E. C. Freeman** has become factory manager; **Norman R. Reno**, master mechanic; and **Robert W. Fries**, planning superintendent.

Vacuum Metals Corp.—**Alfred H. Lewis** has been named sales manager.

Nash Motors Div., American Motors Corp.—Roy Abernethy has been appointed vice-president of sales. He succeeds H. C. Doss, who has resigned to become a consultant.

Willys Motors, Inc. — **Hickman Price, Jr.**, has been named vice-president in charge of sales.

Youngstown Sheet & Tube Co.—**Myron W. Watkins** and **George McCuskey** were elected vice-presidents.

Arma Div., American Bosch Arma Corp.—**Clifton T. Foss** has been named assistant general manager.

Lincoln-Mercury Div., Ford Motor Co.—**Robert J. Fisher** was named advertising manager.

Caterpillar Tractor Co.—**Charles A. Woodley** was elected a vice-president, and **Lloyd J. Ely** was made manager of the Peoria, Ill., plant.

Moline Tool Co.—**Richard H. Bergstrand** has been appointed chief design engineer.

Hughes Aircraft Co.—**Lawrence A. Hyland** has been appointed vice-president and general manager.

Mather Spring Co.—**Henry F. Watkins** has been appointed chief industrial engineer.

Timken Roller Bearing Co.—**Richard L. Frederick** has been named director of industrial relations.

Aeroquip Corp.—Robert W. Bowman has been appointed chief industrial engineer, and Kent R. Manning has been made factory manager.

Plymouth Motor Corp. — William J. Bird was elected vice-president in charge of sales.

American Chemical Paint Co.—**D. L. Miles** is now manager of the Windsor, Ont., office and plant and is assisted by **J. Bryce Rohrer**, technical sales representative. Staff members include: **O. E. Chrisler**, technical service representative; **John Linden**, technical representative, specializing in steel mill operations; **F. J. Walsh**, technical sales-service representative, Ontario Div.; and **Luc Breault**, technical sales-service representative, Quebec Div.

P & C Hand Forged Tool Co.—**J. Earl Jones** was elected chairman of the board, and **B. H. McClain** was chosen to succeed him as president.

(*Turn to page* 160, *please*)

Necrology

Ollie V. Badgley, 67, retired general manager of Delco-Remy Div. of General Motors Corp., died Oct. 19, at Anderson, Ind.

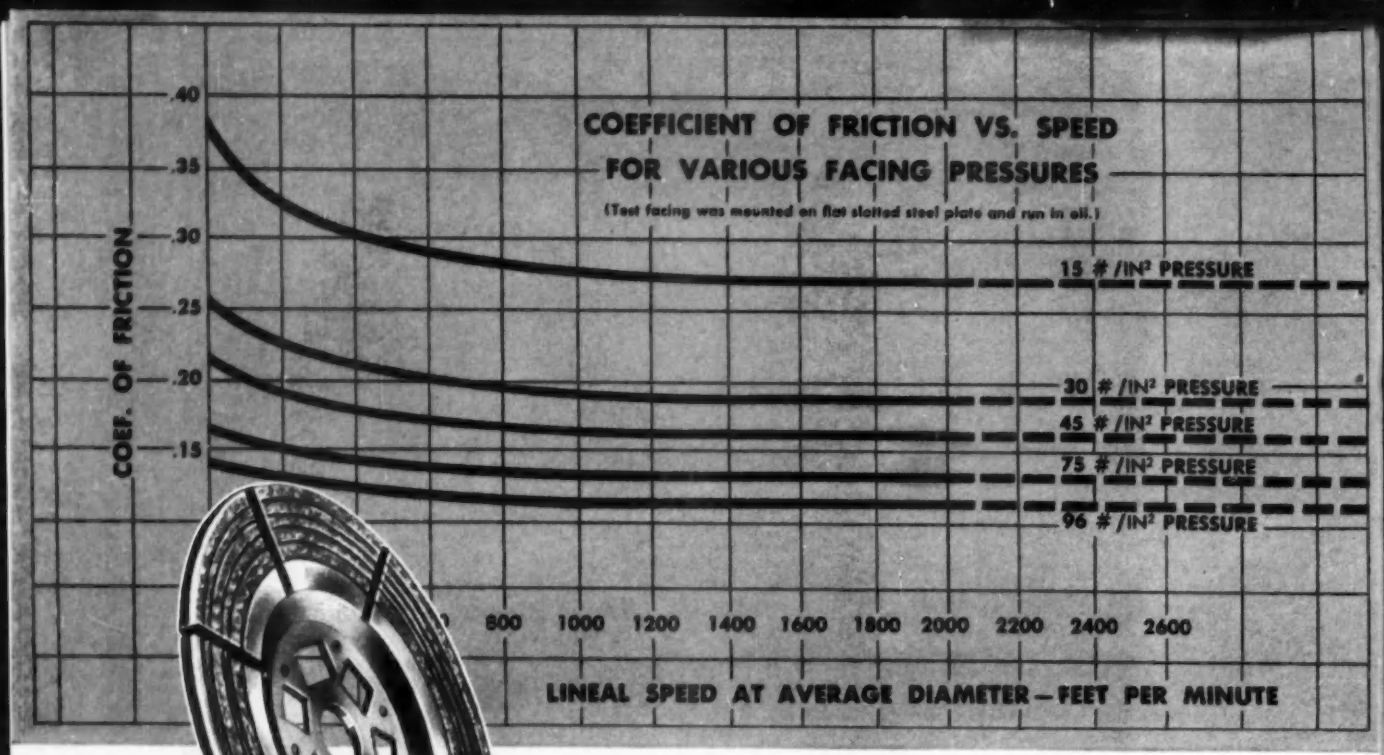
G. Hubert Noble, 66, president of Detroit Metal Products, Inc., died Oct. 24, at Grosse Pointe, Mich.

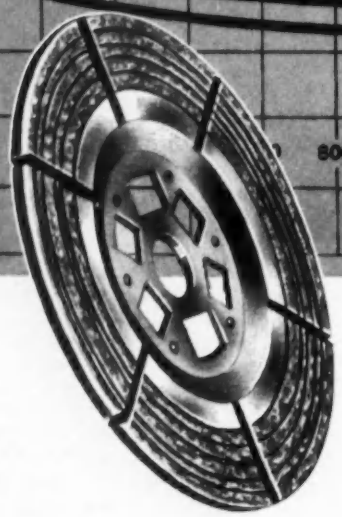
Herbert L. Sharlock, 76, former director of advertising and public relations for Bendix Aviation Corp., died Oct. 16, at Canadaigua, N. Y.

Alfred B. Qualy, 65, former secretary of Willys-Overland, Inc., died Oct. 17, at Toledo, O.

Vaughn Y. Bell, 59, manager of fleet sales and service for Goodyear Tire & Rubber Co., died Oct. 28, at New York, N. Y.

Algernon Guiness, 71, pioneer British motor racer, died Oct. 26, at London, England.





Curves show how typical cork-compound facing delivers high coefficient of friction under varying engagement pressures. This shows usual pattern for cork facings mounted on slotted plates. Variations of this pattern can be obtained by using waved plates or unslotted plates.

In automotive clutches, cork facings offer economy and long, trouble-free service.

When you're designing automotive clutches, you should investigate the unique advantages which cork-compound friction materials offer.

ECONOMY AND LONG SERVICE. Cork's unusually high coefficient of friction, even when immersed in oil, normally makes it possible to use fewer plates, to reduce the plate size, or to lower engagement pressure—and still maintain torque capacity. In such cases, substantial savings can be realized in friction material, metal, fabrication, and assembly.

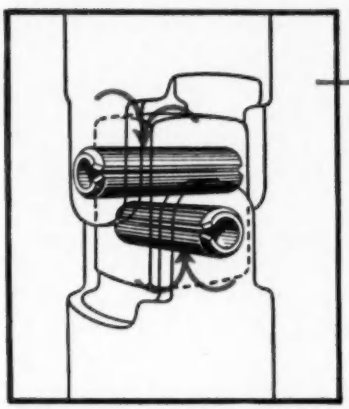
Cork facings offer the further economy of long service. In a properly designed wet clutch, there is virtually no wear, and cork facings will last the life of the transmission and still be serviceable.

TROUBLE-FREE PERFORMANCE. Because they are resilient and non-abrasive, cork facings will not score or damage opposing metal plates. No metal particles are released to damage bearings and contaminate oil. Thus, cork facings eliminate a common cause of clutch trouble.

In automotive transmissions, cork facings have proved their ability to work efficiently without excessively high engagement pressures. Various cork-faced plates are used under unit pressures of 45 psi to about 150 psi with excellent results. In some of these transmissions, the ambient oil temperature during operation is approximately 300° F. As proof of long service life, a cork-compound facing in an automotive clutch still showed clearly the original factory tool marks after 100,000 miles of wear.

Automotive clutches are only one field where cork friction materials are used today. There are many other applications in such fields as business machines, appliances, and industrial equipment. Send us the specifications for your clutches, and we'll gladly help you choose the most efficient cork facings. Write Armstrong Cork Company, Industrial Division, 7211 Imperial Avenue, Lancaster, Pennsylvania.

Armstrong FRICTION MATERIALS



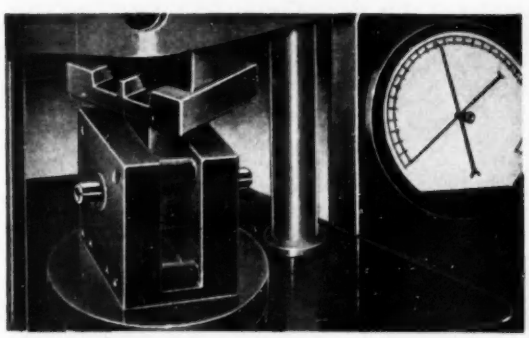
Normal leverage puts the load on the pins at these points. Pins must have a high resistance to shearing – and every pin must stand up to plenty of abuse. Many manufacturers' tests have proved Rollpin's uniformly high shear strength.

consistent strength... as important in the pin as in the socket

The Moore Drop Forging Company, who manufactures the famous Craftsman wrenches for Sears Roebuck and Co., used stainless steel rivets to fasten the universal joint on their Flex sockets. Thorough testing, under all possible load conditions and drive angles, convinced them that Rollpin was stronger than the stainless steel rivet previously used. This led to a redesign of the joint with Rollpins replacing the rivets. Also, the spring tension inherent in the Rollpin locking principle was used to provide the "drag" that holds the socket head in angular position. The result . . . an improved product at lower cost.

Dependability like this is based on the rigid ESNA® quality controls that insure consistent strength and mean reliable performance by every Rollpin.

Moore Drop Forging Company was able to save assembly time, too. Rollpin is simply driven into holes drilled to normal production tolerances. It compresses as driven, locking itself in place by exerting pressure on the hole walls. In this case, the extra operation of spinning on a rivet head was eliminated.



We urge you to test spring pins before you buy – for uniformity of diameter and length, hardness, insertion and removal forces, and recovery of diameter, as well as shear strength.

ELASTIC STOP NUT CORPORATION OF AMERICA

Dept. R29-115, Elastic Stop Nut Corporation of America
2330 Vauxhall Road, Union, New Jersey

Please send me the following free fastening information:

☐ Rollpin samples
☐ Rollpin bulletin
☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name_____ Title_____

Firm_____

Street_____

City_____ Zone_____ State_____

What would You do
without them?
SEE A DIVISION OF
ASSOCIATED SPRING
CORPORATION
WALLACE BARNES COMPANY
BRISTOL, CONNECTICUT
THE WILLIAM D. GIBSON COMPANY
1800 CLYBOURN AVE. CHICAGO 14,
RAYMOND Manufacturing COMPANY
CORRY, PENNSYLVANIA
BARNES-GIBSON-RAYMOND
40300 PLYMOUTH RD. PLYMOUTH, MICH.
B-G-R COOK PLANT
ANN ARBOR MICHIGAN
F. N. MANROSS AND SONS CO.
BRISTOL CONNECTICUT
OHIO DIVISION
1825 EAST FIRST ST. DAYTON, OHIO
DUNBAR BROTHERS COMPANY
BRISTOL, CONN.
MILWAUKEE DIVISION
341 E. ERIE ST. MILWAUKEE, WIS.
SEABOARD Coil Spring Div.
15001 S. BROADWAY GARDENA, CALIF.
IN CANADA
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Hamilton, Ontario

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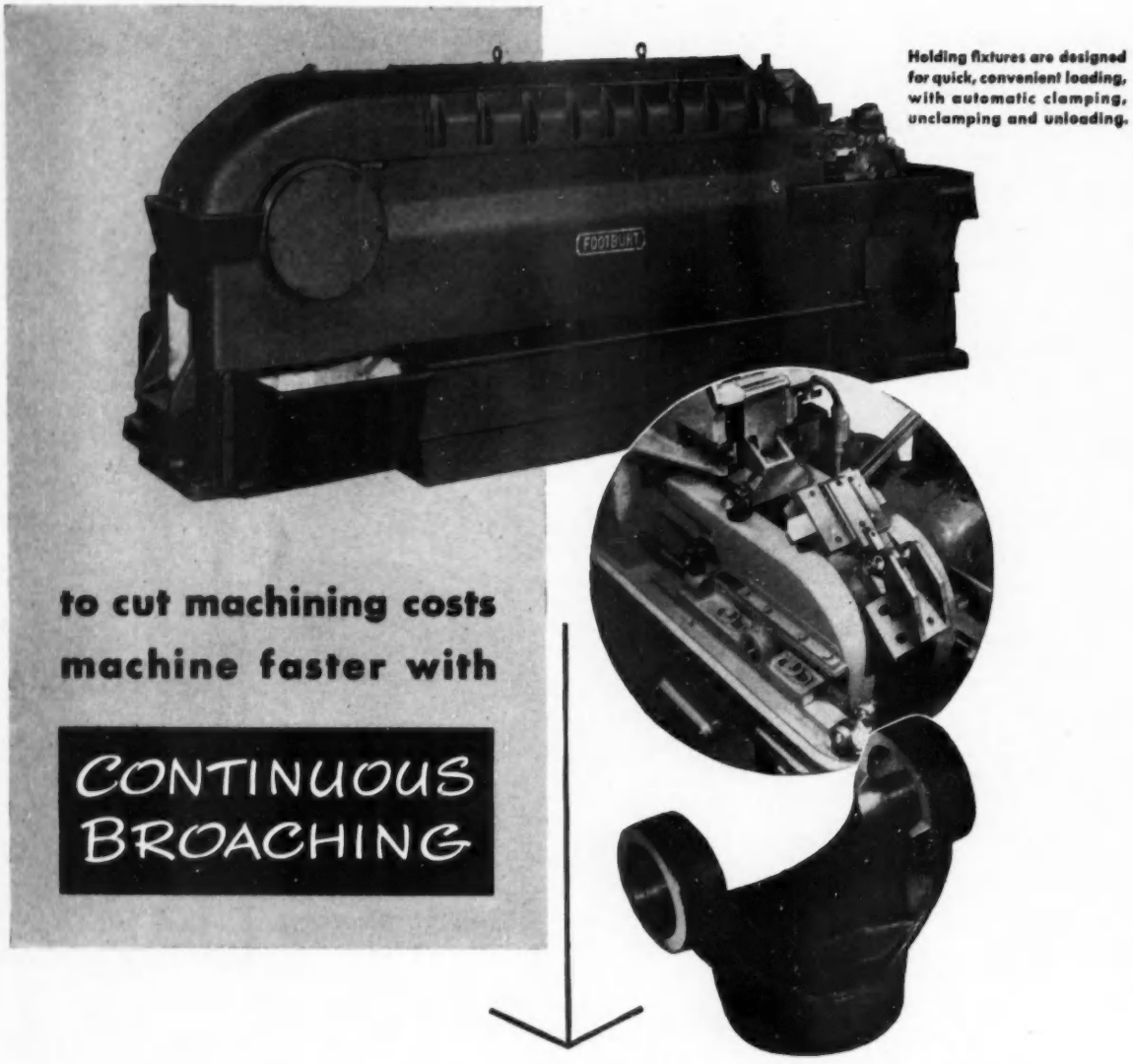

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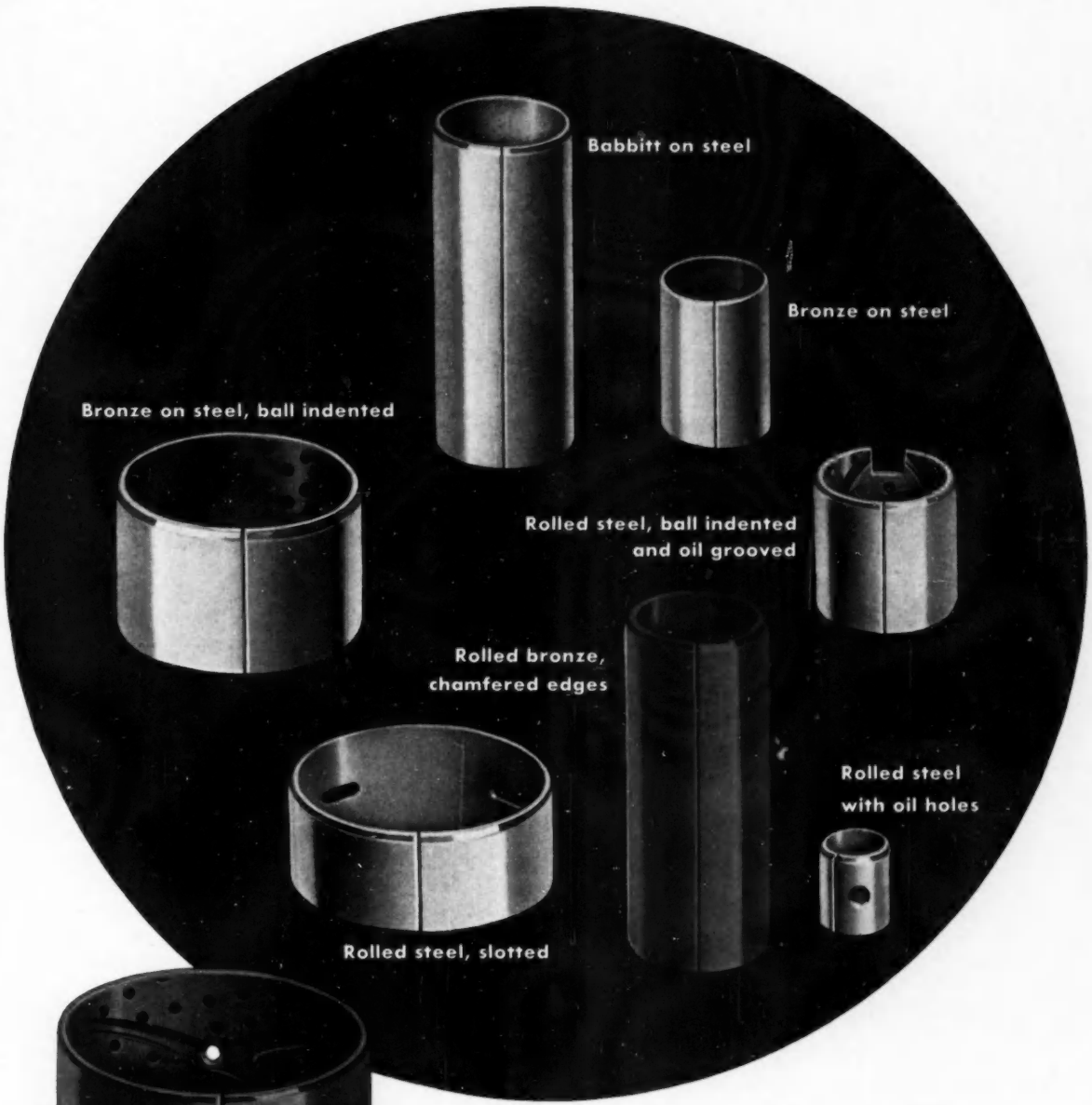

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Also sleeve bearings in many designs and sizes; cast bronze bushings; washers, spacer tubes, precision bronze parts and bronze bars.

A new horizontal grille, new hood ornament, and longer rear quarter panel are among the styling changes for 1955. The model shown is a Capri coupe.

'55 *LINCOLN*

Features New Automatic Transmission

An entirely new Turbo-Drive transmission and a redesigned overhead valve V-8 engine of greater displacement and higher output are among the new features of Lincoln for 1955. Styling changes include a new horizontal grille bar behind the front bumpers and headlight bezels which rake to the front. A new rear quarter panel is eight inches longer than in previous models.

The Turbo-Drive transmission is a combination of a hydraulic torque converter and planetary gearing. Extra performance take-off is provided by permitting a low gear start at wide open throttle through a specially designed throttle kickdown while the selector is in drive position. Its torque multiplication range is said to be greater than that of most other automatic transmissions.

This transmission, which normally has one-shift operation in drive range, has a low gear ratio of 2.40 to 1 and intermediate gear ratio of 1.47 to 1. The torque converter combined with the gear ratios results in overall ratio of 5.04 to 1 maximum torque multiplication.

With the new transmission and more powerful engine it has been possible to reduce the rear axle ratio from 3.31 to 3.07, with a resultant further improvement in fuel economy.

A new hydraulic control system has made it possible to obtain the low gear operation under certain conditions while the transmission selector is in drive range by pressing the accelerator to the kickdown position. From a standing start in drive range the car will move off under wide open throttle in low gear, with an automatic upshift from low to intermediate gear occurring at about 35 mph. Continued acceleration with wide open throttle will result in automatic upshift from intermediate to high gear at about 75 mph. It is also possible to obtain low gear kickdown from intermediate or third gear by depressing the accelerator into the kickdown position if the car speed is below approximately 20 mph.

In addition to the normal type of drive range with its one shift and the kickdown low gear for maximum performance in drive range, the normal low range is available for downhill braking, for extra heavy pulls and for rocking the car in snow or mud.

The five positions on the selector lever are arranged in natural sequence—parking, reverse, neutral, drive and low—eliminating the necessity of going through a forward gear to reach reverse from the drive position.

Lincoln's new Turbo-Drive transmission is entirely air cooled by circulation of air through the housing enclosing the torque converter. Fins on the outer surface of the aluminum converter shell induce air circulation and provide additional surface for transfer of heat to the air stream.

Emphasis has been placed on increasing the torque of the engine for 1955. Horsepower rating now is 225 and the torque 332 lb feet at 2500 rpm. Displacement is increased to 341 cu in. and cylinder bore diameter to 3.9 in. The stroke stays at 3.5 in. but compression ratio in increased to 8.5 to 1.

A newly developed 18 millimeter conical seat spark plug to used. This new plug has a wider heat range

and, with a larger air gap between the insulator and the outside shell of the plug, reduces the possibility of spark plug fouling. The conical seat design eliminates the gasket.

A new high-torque, high-lift camshaft decreases the overlap and results in better acceleration at low speeds and a smoother idle.

Breathing has been improved through a 10 per cent increase in the size of the intake manifold passages.

In redesigning the four-barrel carburetor the choke plates have been repositioned and a new central venting system incorporated. Secondary barrels have been increased in size to 1⅛ inches.

The combustion chamber has been redesigned to an "open" wedge turbulent type with kidney section eliminated to improve exhaust valve cooling and reduce the fuel octane requirement of the engine.

A new air cleaner with less restriction has increased capacity and conduit-type tuning to reduce noise.

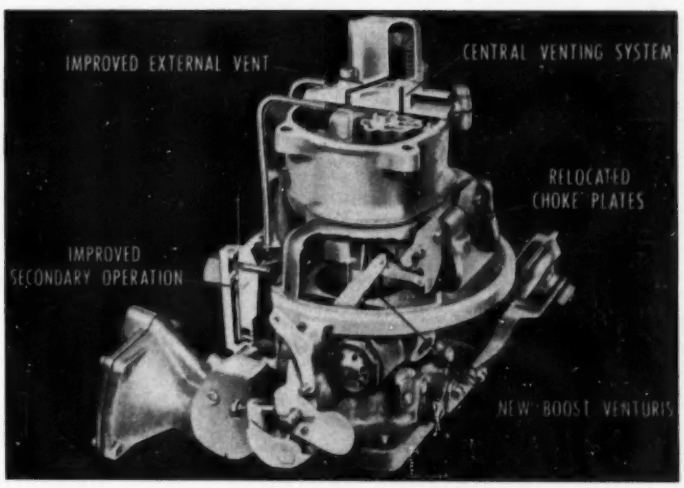
An interesting change has been made in the distributor and oil pump drive. Instead of the usual split shaft with Oldham coupling connection, Lincoln uses a single shaft of hexagon cross section which fits into broached hex bores at both ends. In the oil pump, the gear shaft is pressed into the gear, eliminating the usual key.

Another change in the engine is the adoption of a double V-belt accessory drive.

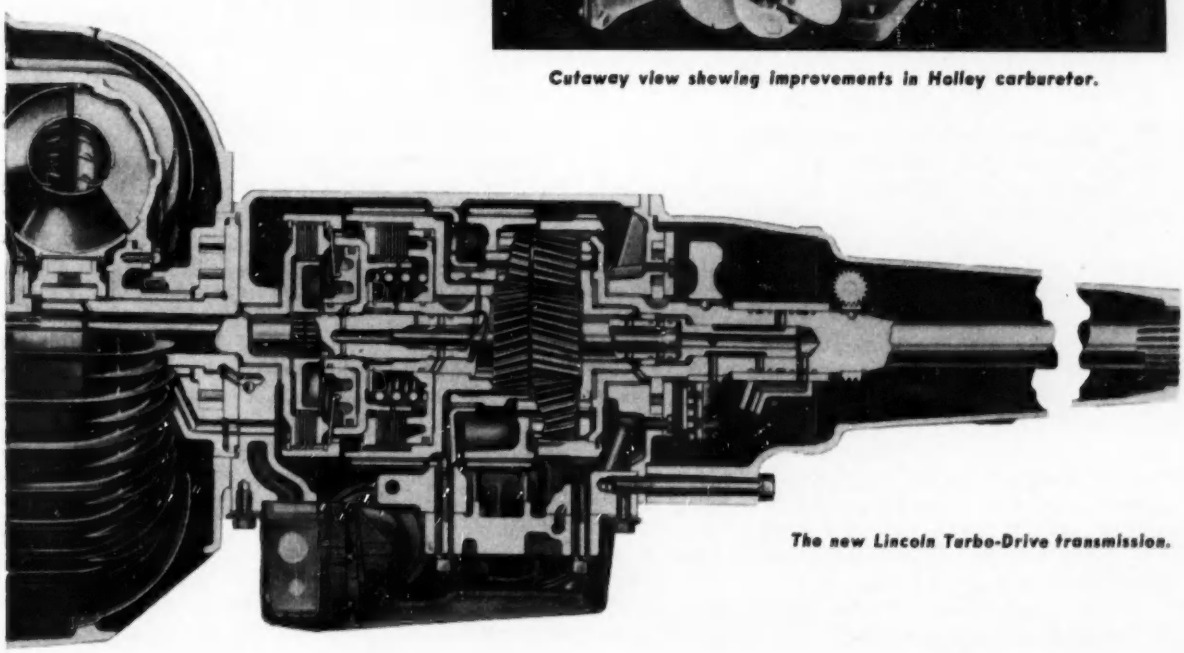
Many design and structural revisions have been made to reduce the noise level of the engine at all speeds. These include changes in the engine covers, additional rubber insulators, quieter timing chain, addition of a pressure relief pocket in the oil pump, quieter manifold heat mechanism and improved tappet design. Rocker arms are now pressure lubricated continuously.

A total of 16 solid body colors and 35 two-tone combinations and 24 interior trim options are offered for 1955. The Lincoln Capri series includes a special custom coupe, special custom 4-door sedan and a convertible. The Lincoln series consists of a custom sport coupe and a custom 4-door sedan.

Power steering, power brakes, electric window lifts and four-way power seat are optional equipment, as is an air conditioning system. Tubeless tires are standard equipment.



Cutaway view showing improvements in Holley carburetor.



The new Lincoln Turbo-Drive transmission.

1955 BUICK V-8 ENGINES
Condensed Mechanical Specifications
90-deg Valve-In-Head Type

	Series 40	Series 50	Series 60	Series 70
Bore (in.)	3.625	4.000		
Stroke (in.)	3.20	3.20		
Displacement (cu in.)	264	322		
Compression Ratio				
Synchromesh	7.5 to 1	8.4 to 1	8.4 to 1	
Dynaflow	8.4 to 1	9 to 1		
Bhp (max.)				
Dynaflow	188@4800 rpm	236@4600 rpm		
Torque (lb ft) max.				
Dynaflow	256@2400 rpm	330@3000 rpm		
Ratio bhp/cu in. disp.				
Dynaflow	0.710	0.733		

A wide-screen grille, new bumper and bumper guards, and a recessed hood are among Buick's styling changes for 1955. The model shown is a Super.

BUICK Introduces Variable

FOR 1955 Buick offers the same setup of models as last year—Series 40—50—60—70—the Series 40 and 60 mounted on 122-in. wheel base; 50 and 70 on 127-in. wheelbase. Front tread is 59-in. on all models. The basic V-8 engines have been subject to still further refinement, and will feature for the first time in passenger car production aluminum alloy connecting rod bearings. The 264 cu in. engine on Series 40 is rated 188-bhp with compression ratio of 8.4 to 1; the 322 cu in. engine with compression ratio upped to 9 to 1 will be used on Series 50, 60, and 70, maximum rating being 236-bhp.

Noteworthy mechanical feature is the introduction of the latest version of Dynaflow drive—Variable Pitch Dynaflow—incorporating a stator assembly with variable pitch blading. The effect of this is to provide better transmission efficiency for cruising and better performance for accelerating.

Variable Pitch Dynaflow also provides the equivalent of a passing gear without gear change, accomplished by changing the pitch of the stator blades.

Saginaw power steering continues standard equipment on Series 70, and will be standard on Series 50, optional on the other series. Tubeless tires are standard equipment on all models, with white sidewalls optional.

Although basic body shells remain the same, many noteworthy changes have been made in styling—interior and exterior. Front fenders and skirts are new, with swept-back front wheel cut-outs similar to the 1954 Skylark. The hood has new appearance, slightly lower at the front.

Front end styling has fresh treatment with the adoption of a radiator grille of honeycomb design, made of a zinc die casting. Complementing the new grille is new front bumper and guard treatment. The rear bumper is new and more massive.

Chassis frames have been revised to provide for the new front bumper mounting, side rails being extended about seven inches, and a front bumper

cross member welded at the extreme front end. Valving on front shock absorbers on Series 40 and 60 has been changed to give a softer ride.

Coming to the engines, refinements have been made to increase volumetric, thermal, and mechanical efficiency. Volumetric efficiency has been improved by providing a larger carburetor on Series 50, 60 and 70 engines; new intake manifolds with larger passages on all engines; a new camshaft with longer opening duration and higher exhaust valve lift on Series 50, 60 and 70; exhaust valve size increased on all engines; exhaust ports in the head streamlined to improve free flow on all engines. Friction losses have been reduced by adoption of a new piston with slots to separate piston skirts from the heavy boss section.

The two exhaust passages leading to the intake manifold have been redesigned to reduce manifold heat with exhaust heat valve open, thus improving volumetric efficiency.

The combination of pulleys and spacers on 322-cu in. engines has been replaced with multi-groove pulleys of one-piece design, eliminating spacers at the crankshaft end.

Moraine 400 aluminum alloy connecting rod bearings are specified for all engines. These bearings consist of a steel back clad with about 0.010-in. coating of cadmium-silicon-aluminum alloy on which is electrodeposited a coating of tin-copper, high-lead babbit about 0.001-in. thick. This type of bearing is claimed to have increased durability, anti-scoring properties, conformability, corrosion resistance, and high load-carrying capacity.

Pitch Dynaflow

The characteristic aluminum alloy domed pistons have been modified with an additional slot cast below each piston pin boss to relieve the piston skirt from distortion due to load or thermal effects, thus assuring conformity of the skirt under all operating conditions. Piston dome height is increased on the 322-cu in. engines for increased compression ratio, only one piston being used on these engines since variations in compression ratio are handled by means of head gaskets of different thickness. Series 40 engines will have two pistons—one for synchromesh, another for Dynaflow.

A new oil pump inlet, released late in 1954, is used on all engines. The oil screen housing is of cylindrical design, moved further forward in the oil pan, providing more constant oil supply under adverse conditions.

Intake manifolds are new, with increased cross-sectional area of branches. Fuel distribution has been improved by equalizing at front and rear the angles made by the inner passages with the approach to the T-intersections. Inlet passages in both two-barrel and four-barrel manifolds remain identical, the only difference between the manifolds being the carburetor mounting pad.

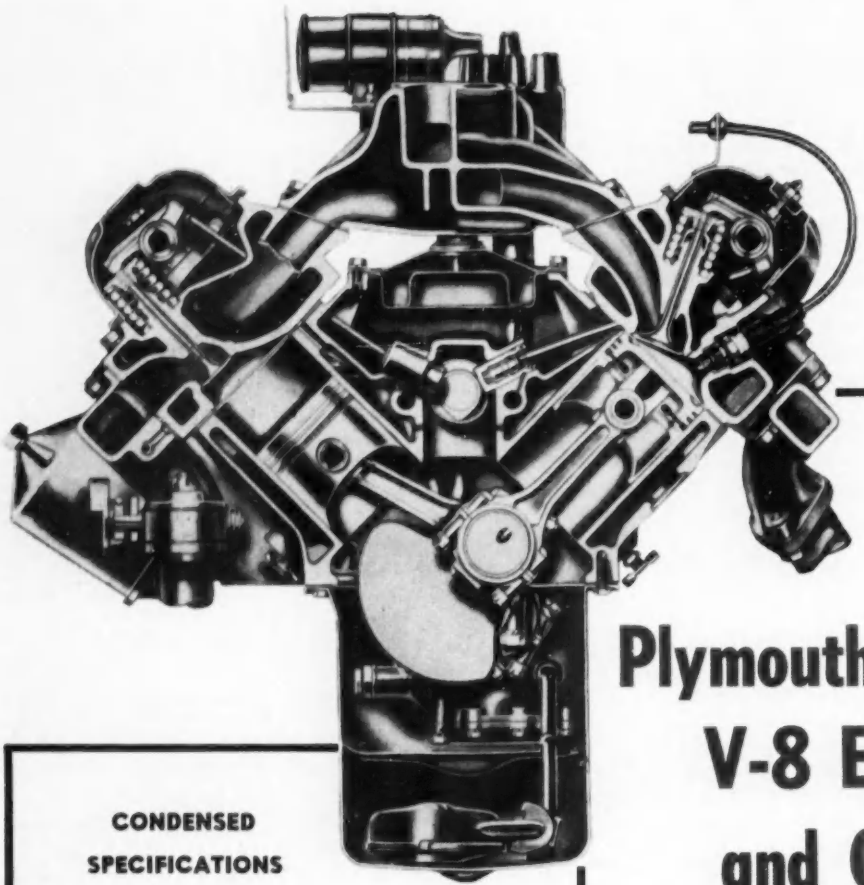
Larger four-barrel carburetors, with $1\frac{1}{4}$ in. throat diameter, are used on Series 50, 60, and 70 engines, replacing the two-barrel carburetor used on Series 50. Carburetors are 5/16-in. lower, allowing for a corresponding decrease in hood height. A new air cleaner and silencer is used on all engines, mounting 5/16-in. lower.

As mentioned earlier, Dynaflow now features a variable pitch stator, consisting of 20 blades, each mounted individually on a crankpin actuated by the stator piston. Oil pressure to one or both sides of the piston moves the blades to either low or high angle positions, corresponding to cruise and performance positions respectively. Stator blade angle depends upon throttle position, the throttle linkage being arranged to actuate a valve in the high accumulator body. For all throttle openings high clutch oil pressure is routed through the control valve to the front side of the stator piston, positioning the blades in low angles. High stator blade angle is obtained after full throttle position is reached, this being accomplished by means of an over-travel in the control mechanism. Throttle linkage then will move the control valve in the high accumulator body, closing off and exhausting oil from the front side of the stator piston. In this maneuver blades are shifted approximately 75-deg from the low angle position, increasing stall speed and torque multiplication. Transitions from low to high or high to low are said to be smooth and imperceptible.

The shift detent plate now is located inside the rear bearing retainer instead of on the steering column,

(*Turn to page* 122, *please*)

NEW Torque Converter Stator Has Blades That Can Be Rotated 75 Deg. Engines Now Develop 188 and 236 Hp



The Plymouth Hy-Fire V-8 engine

Plymouth Adopts V-8 Engine and Other Engineering Advancements

CONDENSED SPECIFICATIONS of 1955 PLYMOUTH ENGINES

Type	Six	V-8	V-8	V-8
Bore (in.)	3.25	3.44	3.563	
Stroke (in.)	4.625	3.250	3.250	
Displacement (cu in.)	230.2	241	259.2	
Compression Ratio	7.4 to 1		7.6 to 1	
Bhp (max.)	117 @ 3600 rpm	157 @ 4400 rpm	167 @ 4400 rpm	177 @ 4400 rpm
Torque (lb ft) Max.	194 @ 1600 rpm	217 @ 2400 rpm	231 @ 2400 rpm	231 @ 2400 rpm
Carburetor		dual	dual	4-bbl
Ratio: Bhp/cu in.	.508	0.651		0.682

An entirely new line of motor cars is offered by Plymouth Div., Chrysler Corp., for 1955. A fresh concept of styling coupled with new bodies, a new V-8 engine, improved chassis features, and a host of optional features such as — coaxial power steering, PowerFlite automatic transmission, power brakes, air conditioning, etc. — all are part of the brilliant new package.

Apart from eye-appeal, the new V-8 engine represents the most outstanding mechanical feature of the line. Actually, the buyer is offered a choice of two engines—the L-head Six, and the V-8 in all models. The line-up of models, given in tabular form, has one basic characteristic, namely, that wheelbase has been upped to 115-in., overall length to 203.8 in. The increase in overall length is 10.3 in., marking a definite shift to a big car physically. On the other hand, overall height has been reduced to 60.1 in. for all sedans. Sport Coupe height becomes 59.3 in. Tubeless tires now are available at the owner's option without extra cost.

The Plymouth V-8 is said to be simple and compact, and to take less room under the hood. One of its distinctive features is the use of only a single rocker arm shaft in conjunction with a

Belvedere four-door sedan

1955 PLYMOUTH MODELS

Basic Model	Body Types Six-cylinder Engine	Body Types V-8 Engine
PLAZA	4-door Sedan Club Sedan 3-pass. Coupe 2-dr. Suburban	4-door Sedan Club Sedan 2-dr. Suburban
SAVOY	4-door Sedan Club Sedan	4-door Sedan Club Sedan
BELVEDERE	4-door Sedan Club Sedan Sport Coupe (Hardtop) 4-dr. Suburban (2 or 3 seat)	4-door Sedan Club Sedan Sport Coupe (Hardtop) 4-dr. Suburban (2 or 3 seat) Convertible Coupe

specially designed valve train which permits a lateral valve arrangement. This results in a combustion chamber of unique geometry, said to effect high thermal and volumetric efficiencies.

The consequent compactness about the valve train and combustion chamber permits use of a small valve cover and results in a convenient location of the spark plug outside the valve cover. The 7.6 to 1 compression ratio makes it possible to operate on regular grade gasolines.

A newly designed low-friction valve lock permits valve rotation without the complication of the former mechanism. The lock has four beads and wedges against the spring retainer rather than the valve. Hydraulic valve lifters, made from newly developed hardenable iron castings, are used in this engine.

Pistons are of aluminum-alloy, tin-plated, and with a precision-turned, elliptical skirt. A cast-in steel band controls piston expansion.

The dual-throat carburetor is housed in an aluminum die casting, combining low height, light weight, and simplicity of construction. The integral automatic choke has the Chrysler heat retainer plate to match choke operation to engine temperature.

The Six remains unchanged in basic design, and retains the features used heretofore.

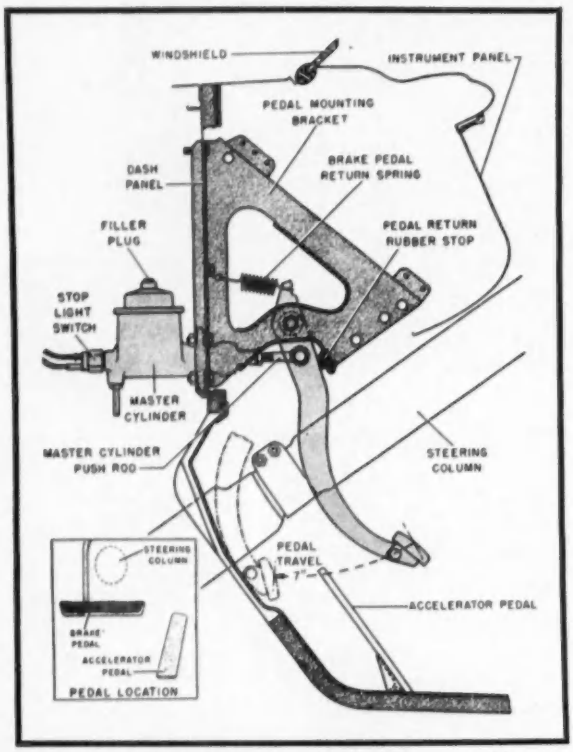
Coming to optional mechanical features, Plymouth offers the PowerFlite transmission, coaxial power steering, power brakes, a new heating system contained in a plastic housing and mounted entirely on the dash, and an improved Airtemp air conditioning system. The latter employs a two-cylinder reciprocating type compressor, and features a magnetic type clutch for automatically engaging compressor drive only when cooling is needed.

All cars are fitted with the V-8 have symmetrical idler arm steering linkage. Manually operated steering gear is of low-friction character, embodying a three-tooth roller, which is mounted on two ball bearings.

Some noteworthy changes have been effected in the suspension system. Rear springs have been widened to 2.5 in. to provide greater resistance to twisting. The lower eye of the rear shock absorber is moved from the front of the axle housing to the rear. At the front, the shock absorbers now are housed within the coil springs, the lower end being seated on the lower control arm, the upper end attached to the frame through a rubber-isolated "spike" mounting. The lower end, however, has a specially designed, high strength ring mounting to resist all damage.

The chassis frame, which is new, employs a strong box section similar to the former model. The rear end has been extended some six inches to take care of increased body length. To tie the body more securely to the frame, the number of body bolts has been increased to 14 on all models except convertibles, the latter having 16 bolts. *(Continued on next page)*

The brake system offers some significant changes. Front brakes on all V-8 cars are increased to 11-in. diameter; V-8 Suburbans have 11-in. brakes front and rear. Nylon bushings replace bronze bushings in the brake linkage system. In addition, brake pedals now are suspended from the dash.



Suspended brake pedal and master cylinder assembly used on PowerFlite equipped cars

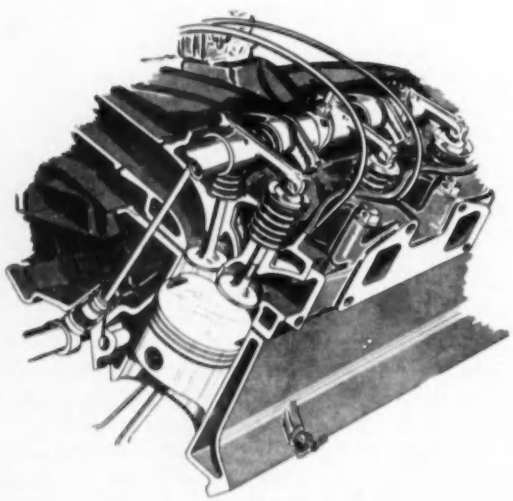
Optional power brakes have the vacuum cylinder mounted integrally with the master cylinder.

All cars using standard transmission are equipped with a suspended clutch pedal. V-8 cars will have a 10-in. clutch, while those using the Six will continue the regular 9.25-in. clutch, now equipped with heavier springs.

Besides the improvements in mechanical features noted above, Plymouth offers new and more ruggedly constructed bodies, featuring many noteworthy optional items. For example, fore-and-aft power front seat adjustment is available, using electric motor actuation. Both power and manual-controlled seats have a fore-and-aft range of five inches, and 1⅛-in. range vertically.

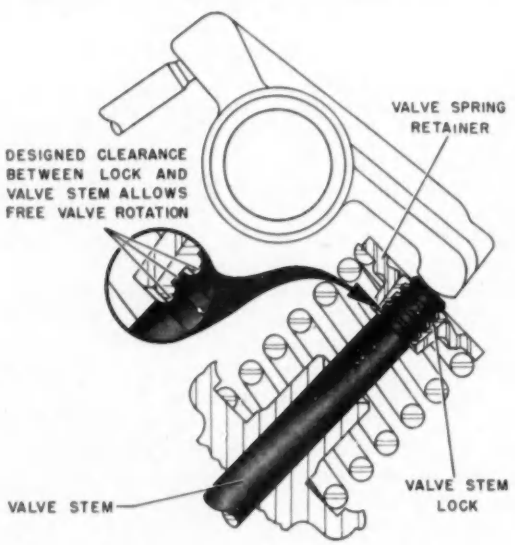
Electrically-actuated power window lifts are available as special equipment on all models. An electro-hydraulic top-actuating mechanism is available on convertibles. Convertible top material now is a heavy vinyl-coated fabric, more resistant to fading and shrinkage.

Body construction has some noteworthy features. Roof rails are boxed-in, windshield construction is more rugged, and center posts are more rigid. Stiffeners welded to the underside of the floor pan provide increased rigidity. Door hinges are new, adjustable in three positions—in and out, up and down, forward and back. Front hinges are out-swinging to provide maximum opening.



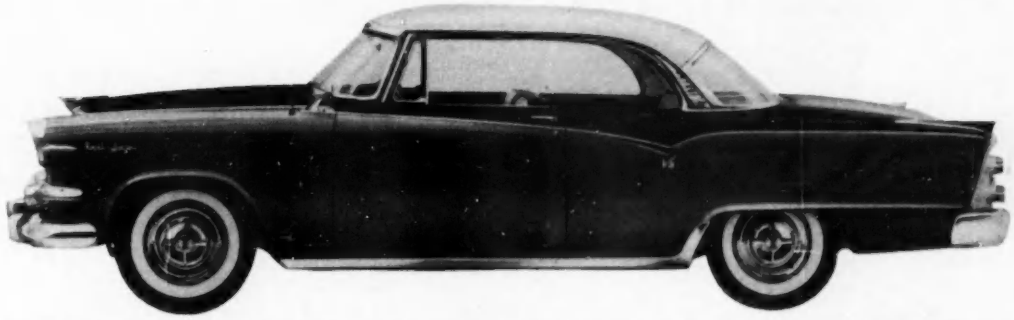
VALVE DRIVE TRAIN

Cutaway view of the valve drive train in the new V-8 engine


VALVE SPRING RETAINER
DESIGNED CLEARANCE BETWEEN LOCK AND VALVE STEM ALLOWS FREE VALVE ROTATION
VALVE STEM
VALVE STEM LOCK

LOW FRICTION VALVE LOCK

Low friction valve lock used in the V-8 engine



Custom Royal Lancer hardtop. Lancer convertible and hardtop models are finished in three-tone paint combinations.

Dodge Engines Range From 123 to 193 Hp

A WIDE choice of engines is offered by Dodge for the 1955 passenger cars. These are: the Get-Away Six developing 123 hp; the all-new Red Ram V-8 rated at 175 hp; the Super Red Ram V-8 at 183 hp; and the super-powered Super Red Ram V-8 at 193 hp.

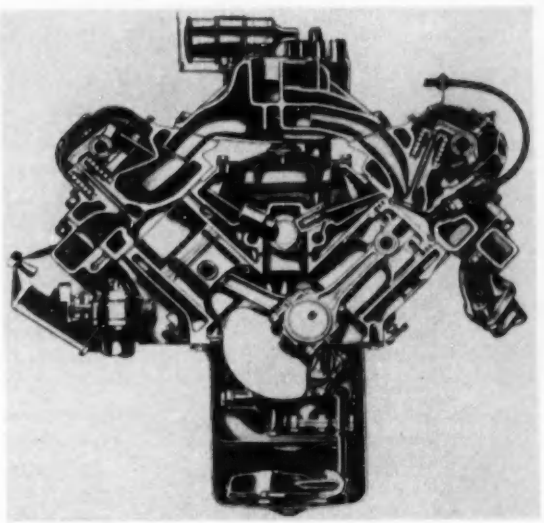
Of the 12 models being introduced, three are in the all-New Custom Royal series. They are the Custom Royal Lancer hardtop, Custom Royal Lancer convertible and four-door sedan.

The Royal series includes a Royal Lancer hardtop, four-door sedan and Sierra four-door station wagon in either six or eight passenger type.

The Coronet series offers a Coronet Lancer hardtop, four-door sedan and Suburban two-door station wagon with V-8 engine. Coronet four-door sedan, two-door sedan, and Suburban two-door station wagon are available with six-cylinder engine.

All models have an increased wheelbase of 120 in.

(*Turn to page* 138, *please*)

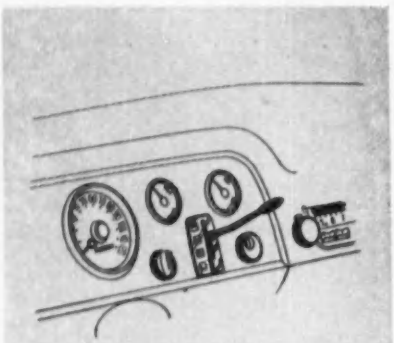


Red Ram V-8 engine. Note the modified hemispherical bustion chambers.

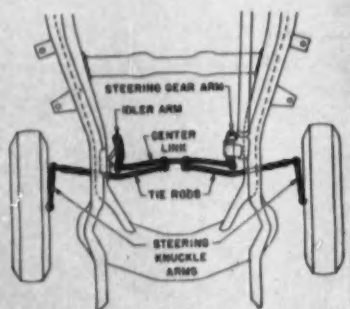
1955 DODGE V-8 ENGINES

	Red Ram	Super Red Ram	Super Power Red Ram
Type Chamber	Modified Hemispherical	Hemispherical	
Bore (in.)	3.63	3.63	3.63
Stroke (in.)	3.256	3.256	3.256
Displacement (cu in.)	270	270	270
Compression Ratio	.....	7.6 to 1	.....
Bhp (max.)	175 @ 4400 rpm	183 @ 4400 rpm	193 @ 4400 rpm
Torque (lb ft) max.	240 @ 2400 rpm	245 @ 2400 rpm	245 @ 2800 rpm
Carburetor	Dual	Dual	4-bbl
Special Equipment	.....	.....	Dual Exhaust

DE SOTO Improvements for 1955



The selector lever for PowerFlite drive is mounted on the instrument panel as shown here



Symmetrical idler arm steering linkage

WITH its sights set on greater torque ability for improved acceleration on starting and safe highway passing, De Soto Div., Chrysler Corp., has increased the displacement of its basic engine to produce the 185-bhp Firedome V-8 and the 200-bhp Fireflite V-8, the result being reflected in improved torque as well as increased output.

From the standpoint of mechanical details, De Soto offers many new features, including: a full length box-section frame with greater rigidity, more rigid frame-body structure, new front suspension system, new steering linkage, and an improved manual steering gear requiring less effort.

Tubeless tires are offered as standard equipment. Among the extra cost features available this season are: Chrysler Corp. coaxial power steering, PowerFlite automatic transmis- (*Turn to page* 114, *please*)

CONDENSED MECHANICAL SPECIFICATIONS
1955 DESOTO V-8 OVERHEAD VALVE ENGINES

	Firedome	Fireflite
Bore (in.)	3.720	
Stroke (in.)	3.344	
Displacement (cu in.)	290.8	
Compression ratio	7.5 to 1	
Bhp (max.)	185 @ 4400 rpm	200 @ 4400 rpm
Torque (lb ft) max.	245 @ 2800 rpm	274 @ 2800 rpm
Carburetor	Two-barrel	Four-barrel
Ratio—bhp/cu in.	0.636	0.687

MERCURY *adds* New Series of Cars

Montclair coupe, one of three models in the new Montclair series

A NEW series—the Montclair—has been added to the Mercury line for 1955. In addition, cars in the Monterey and Custom series have been restyled and re-engineered. There are 10 models in the three series.

Wheelbase of all cars has been increased to 119 in. and exterior dimensions increased two inches in length and two inches in width. All are one inch lower than previous models, with the low-silhouette Montclair an inch-and-a-half lower still. The rear tread is three inches wider and the frame is one inch closer to the ground. Much wider vision is provided by a full-scope windshield.

As indicated on the engine specification table, Mercury has a new basic engine with increased displacement, stemming from larger bore and stroke. This greater displacement assures high torque at the low end, and results in higher horsepower ratings as well. The higher compression version of this engine is standard equipment of Montclair series equipped with optional Merc-O-Matic drive; and is available at extra cost on other Merc-O-Matic drive models.

Besides increased displacement, the new engine incorporates additional improvements. There is improved valve and spark plug cooling, stemming from larger water passages. In addition, the water pump has 23 per cent more capacity. It is provided with a larger by-pass and smaller port thermostat for improved heater performance. These engines are fitted with the newly released 18 mm Champion conical seat spark plug.

Dual exhausts are standard equipment on all Montclairs and Montereys. A new Y-exhaust system is standard on the Custom series, where dual exhausts may be obtained as optional equipment.

The Merc-O-Matic transmission has been redeveloped to handle the higher torque of the 1955 engines. It has a larger torque converter than in previous

(*Turn to page* 116, *please*)

1955 MERCURY V-8 ENGINES CONDENSED MECHANICAL SPECIFICATIONS

	Mercury Custom Monterey	Montclair
Bore (in.)	3.75	
Stroke (in.)	3.30	
Displacement (cu in.)	292	
Compression ratio	7.6 to 1	8.5 to 1
Bhp (max.)	188 @ 4400 rpm	198 @ 4400 rpm
Torque (lb ft) max.	274 @ 2500 rpm	286 @ 2500 rpm
Exhaust system	Y-connection at rear	Dual
Ratio bhp/cu in.	0.644	0.657

Note: 198 hp V-8: Standard in Montclair models equipped with optional Merc-O-Matic Drive, extra cost in other Merc-O-Matic equipped models. 188 hp V-8: Standard in Monterey and Custom Series, and in Montclair models with standard transmission or overdrive.

FORD Enters 1955 With Larger V-8 and New Bodies

Fairlane Crown Victoria with arch of chrome over top

A NEW line—the Fairlane series—is added to Ford's other three lines of passenger cars for 1955. Features of the cars in all four lines are a wrap-around windshield and a new, lower silhouette. They also have a flatter hood and a longer rear deck. Concave grille is composed of a chrome-plated grid.

Included in the Fairlane series is a Crown Victoria model which has an arch of chrome over the top, and is available with a transparent roof over the driver's compartment. With an overall height of only 58.2 in., it is the first Ford sedan under five feet in height. In addition to the two Crown Victorias, body styles in the Fairlane series are the Sunliner convertible, the Victoria, the four-door Town Sedan and the two-door Club Sedan.

The station wagons for 1955 are: the eight-passenger Country Squire, with side moldings of wood grained glass fibre; an eight-passenger Country Sedan; a six-passenger Country Sedan; a Custom Ranch Wagon and a Ranch Wagon.

Ford's Customline series consists of Fordor and Tudor sedans.

The new Tudor Business sedan, the Tudor sedan and the Fordor sedan make up the lowest priced series.

New rear end styling is seen in this view of a Customline Tudor sedan

For the first time, Ford offers three engines: A new high compression 182 hp V-8 engine of 272 cu in. displacement and an 8.5 to 1 compression ratio; a new 162 hp V-8 engine of 272 cu in. displacement and a 7.6 to 1 compression ratio; an improved 120 hp six cylinder engine of 223 cu in. displacement and a 7.5 to 1 compression ratio. The new V-8 engine has a 3.62 in. bore and 3.30 in. stroke.

The high compression engine, available only with Fordomatic transmission in the Fairlane series and on Station Wagons, has a four-barreled carburetor with automatic choke and special intake manifold; dual exhausts; special vacuum controlled distributor; high compression cylinder heads and high capacity radiator. The V-8 and six cylinder engines are available with any of the 16 car models. Champion 18 mm tapered seat valves are used in the engines.

An improved Fordomatic transmission gives the driver a choice of faster get-away, when desired, without manual shifting. By pressing the accelerator to the floor the driver gets an automatic low-gear start. Overdrive and regular transmissions also are optional. An illuminated Fordomatic drive selector now is mounted in the instrument panel.

Larger brakes are used on all models with 25 per cent more braking surface on station wagons.

Ford's new, lower silhouette is the result of a redesigned frame which has made possible a reduction in overall height of all models. Sedans are reduced 1.3 in. under the 1954 models without loss of headroom.

An improved ride and easier handling are said to

(*Turn to page* 158, *please*)

FORD *Trucks In 24 Series for '55*

THE 1955 Ford trucks will be manufactured in five lines and 24 series which include: Nine conventional series, six cab forward series, four school bus chassis series, two tandem axle series, two parcel delivery chassis series and a new Courier custom delivery truck styled like the 1955 Ford passenger cars. GVW ratings run from 4000 to 40,000 lb and GCW ratings to 60,000 lb. There are 15 wheelbase lengths for custom - built bodies from 5½ to 19 ft long.

Vacuum - boosted power brakes now are offered on all models, and for 1955 the 800 and 900 Series will have new self-contained air brakes with an actuating chamber mounted on the brake facing plate.

Truck cabs have been designed for even greater driving ease and efficiency than current models. The big, one-piece curved windshield, deep side windows and a rear window which

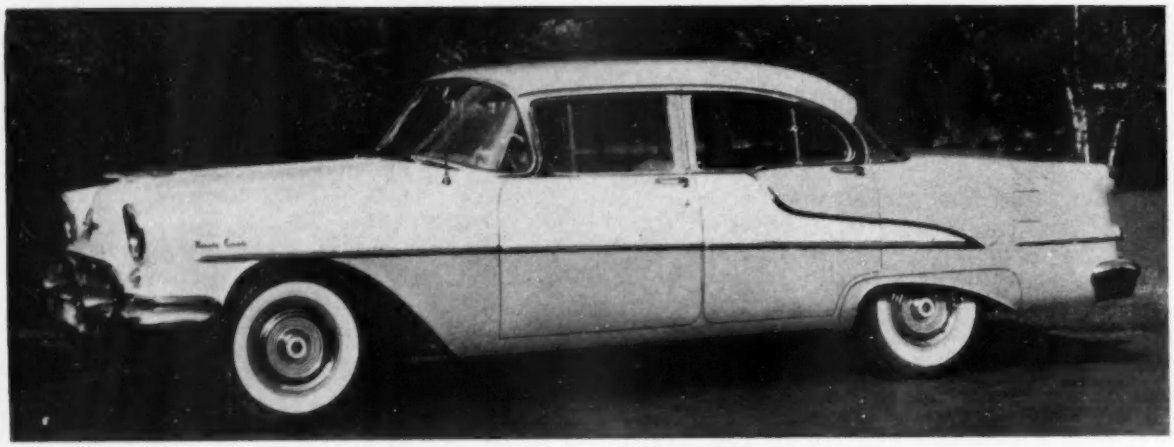
(*Turn to page* 134, *please*)

Ford C-600 stage body truck

CONDENSED SPECIFICATIONS OF 1955 FORD TRUCK ENGINES

Engine	Displ.	Horsepower	Torque	Bore	Stroke	Comp.
Cost Clipper Six	223 cu in.	*118@3800 rpm	195@1200-2400 rpm	3.62	3.60	7.5
Power King V-8	239 cu in.	132@4200 rpm	215@1800-2200 rpm	3.50	3.10	7.5
Power King V-8	256 cu in.	140@3900 rpm	228@1900-2400 rpm	3.62	3.10	7.5
Cargo King V-8	279 cu in.	152@3800 rpm	246@1800-2400 rpm	3.56	3.50	7.2
Cargo King V-8	317 cu in.	170@3900 rpm	286@1700-2300 rpm	3.80	3.50	7.2

* 116 hp, 194 lb-ft torque on P-Series Parcel Delivery chassis.



Series 98 four-door sedan with two-tone flying colors styling.

OLDSMOBILE Engines Upped to 185 and 202 Hp

1955 OLDSMOBILE V-8 ENGINES CONDENSED MECHANICAL SPECIFICATIONS

	88 Series	Super 88 Ninety-Eight
Bore (in.)	3⅞	
Stroke (in.)	3⅞	
Displacement (cu in.)	324.3	
Compression Ratio	8.5 to 1	
Bhp (max.)	185@4000 rpm	202@4000 rpm
Torque (cu in.) max.	320@2000 rpm	332@2400 rpm
Carburetor	two-barrel	four-barrel
Ratio—Bhp/cu in.	0.539	0.622

FURTHER engine refinements, redesign of the front suspension, and sheet metal changes are among the more notable features of Oldsmobile for the coming season.

Style-wise, Oldsmobile has made numerous sheet metal changes including—new front fenders with hooded headlamps, new hoods, new front bumpers and grille treatment, new rear bumpers and tail lamp treatment. Although bodies remain unchanged, the fresh interior trim combined with modifications in exterior molding treatment give the cars a new look when combined with the sheet metal changes.

Line-up of models for '55 is as follows: Ninety-Eight; four-door sedan, Holiday Coupe, Deluxe Holiday Coupe, and Starfire. Super 88; four-door sedan, two-door sedan, Holiday Coupe, and Convertible Coupe. The 88; two- and four-door sedans, and Holiday Coupe.

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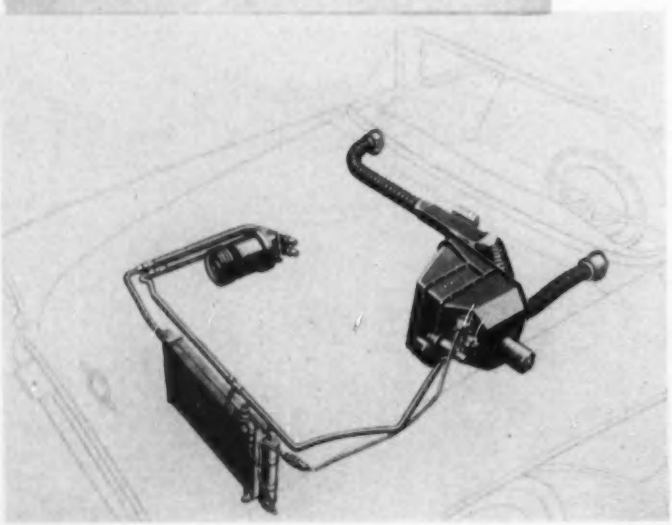

Schematic diagram of the air conditioning system which is available as optional equipment at extra cost. The compressor is at the right of the engine and runs from a dual pulley off the crankshaft. The condenser and dehydrator are installed just in front of the radiator. The evaporator and blowers are in the large distribution unit at the right. Cool air flows into the car interior through three outlets on the instrument panel.

Windsor Deluxe which is powered by the new 188-hp V-8 engine.

The Custom Imperial has a wheelbase of 130 in. Its engine is a 250-hp Fire Power V-8.

1955 Chryslers and Imperials

THE new Chryslers are offered in two lines—the Windsor Deluxe and New Yorker Deluxe. Both lines have a wheelbase of 126 in. The Windsor Deluxe is available in a six-passenger sedan, Nassau hardtop coupe, Newport hardtop, convertible and Town and Country wagon. The New Yorker Deluxe models are available in a six-passenger sedan, Newport hardtop coupe, new St. Regis special two-tone hardtop coupe, convertible and Town and Country wagon.

Styling changes include a divided two-element box-check grille set over a third opening extending across the front of the car. On the New Yorker Deluxe a floating bar bumper guard runs across and above the bumper with oval parking lights at each end. Contour line bumpers wrap around the front fenders and extend to the wheel openings.

The windshield is wrapped around at both top and bottom with rearward sloping side pillars. Because the pillars have been moved rearward, visibility is increased throughout the entire height of the windshield. Windshield area has been increased 20 per cent and all windows are larger. Hip room has been increased four inches in the rear seat compartment.

All Chrysler models are powered by V-8 engines. The 250-hp FirePower V-8 for the New Yorker Deluxe has a bore of 3.81 in. and stroke of 3.63 in. with 331-cu in. displacement. It has a compression ratio of 8.5 to 1 and a torque rating of 340 lb ft. A new four-barrel carburetor is used. All of the features of the FirePower engine have been retained or improved in the new engine.

The 188-hp Spitfire V-8 engine was specifically developed for Windsor Deluxe models. It is said to retain the advantages of the hemispherical combustion chamber in a lighter, more compact design. Using basically the same block as the FirePower V-8, it has a similar large bearing area and crankcase rigidity.

With a bore and stroke of 3.63 in. and displacement of 301 cu in., it develops 275 lb-ft torque. Its 8 to 1 compression ratio permits development of full power on regular-grade gasoline. Large valves and short smooth ports provide for low resistance to intake and exhaust gas flow. A unique valve train makes possible a lateral valve arrangement using only a single rocker shaft on each bank of cylinders.

The new engine, like the FirePower V-8, has full-pressure lubrications, tin-plated pistons of aluminum

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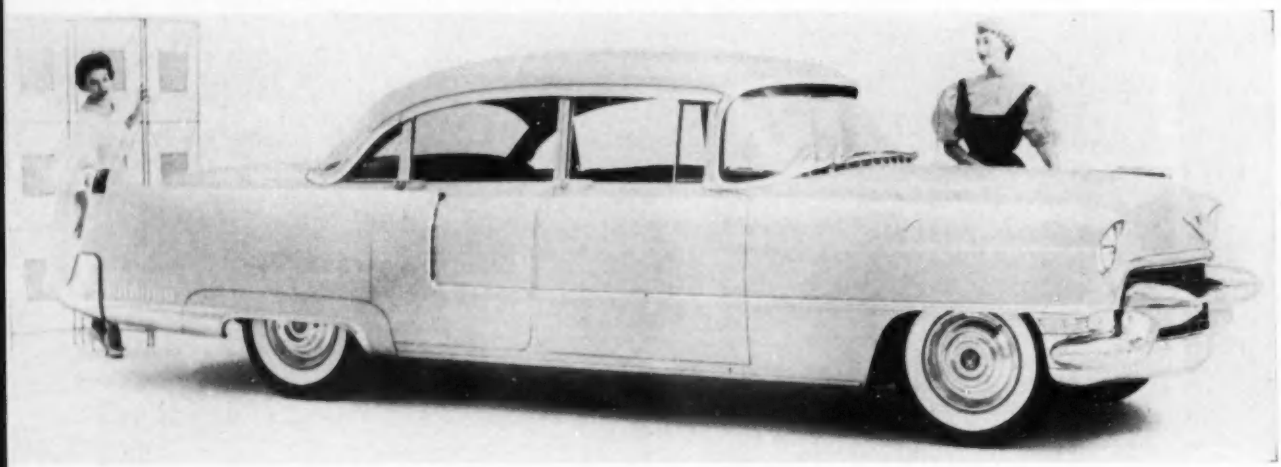
250 and 270 Hp Engines in New Cadillacs

ADVANCEMENTS in design have increased the output of Cadillac's V-8, overhead valve engine to 250 hp for the Series 62, Fleetwood Series 60, and Fleetwood Series 75. When installed in the Eldorado, Cadillac's special sports type production convertible, the engine is equipped with dual four-barrel carburetors and develops 270 hp.

The 270 hp engine with dual four-barrel carburetors which powers the Eldorado of course has a new intake manifold and special throttle controls. Transmission shift points and the rear axle ratio in the Eldorado are modified to take advantage of the increased power. The Eldorado engine and transmission will be offered as a factory option on a limited basis in the 62 and 60 Series Cadillacs.



Series 60 Special Fleetwood sedan

The Hydra-Matic transmission, which is standard equipment on all Cadillac 1955 models, has been redesigned to handle the engines' higher power and to greatly improve acceleration between zero and 60 mph.

Compression ratio of the engine has been increased to 9 to 1, and valve rocker arms have been changed to increase engine breathing efficiency by permitting freer flow of both intake and exhaust gases.

Carburetor changes are aimed at insuring engine smoothness when idling.

Other engine refinements include a more rigid crankshaft, narrower connecting rod bearings made possible through the use of greatly improved bearing material, and a new pump which increases water circulation at lower speeds by 20 per cent.

Shock absorber valving has been refined and a new flexible coupling in the steering shaft practically eliminates road vibration at the steering wheel.

Power brakes now require less foot pressure and shorter travel.

European Nations May Supply Machinery for Mexican Needs

REPRESENTATIVES of Britain, France, and West Germany, present at the third convention of the Mexican National Association of Machinery Importers, stated that their respective governments are extremely interested in supplying agricultural machinery as well as light and heavy industrial machinery to the Mexican market. These exports would increase commercial interchange with Mexico, the delegates said.

First major point accomplished by the convention was the creation of a financial institution for imports of machinery. It will have an initial capital of $80,000 but provisions have been made for an increase to $64 million for purchase and credit operations to obtain machinery for agriculture, public works, the replacement of outmoded industrial equipment, and perhaps even the setting up of airplane parts manufacturing in Mexico.

Increase of 3.6 Per Cent Forecast for 1954 Motor Vehicle Registrations

By Marcus Ainsworth

MOTOR vehicle registrations in the United States continue to show an upward trend and by the end of the 1954 registration year should number approximately 57,603,372 as compared with 55,594,734 in 1953. In addition, there will be approximately 690,000 Federal, State and local Government owned vehicles.

This estimate of 1954 registrations is the result of the annual survey conducted by AUTOMOTIVE INDUSTRIES and is based on returns from 45 states and the District of Columbia. Actual data for the latest

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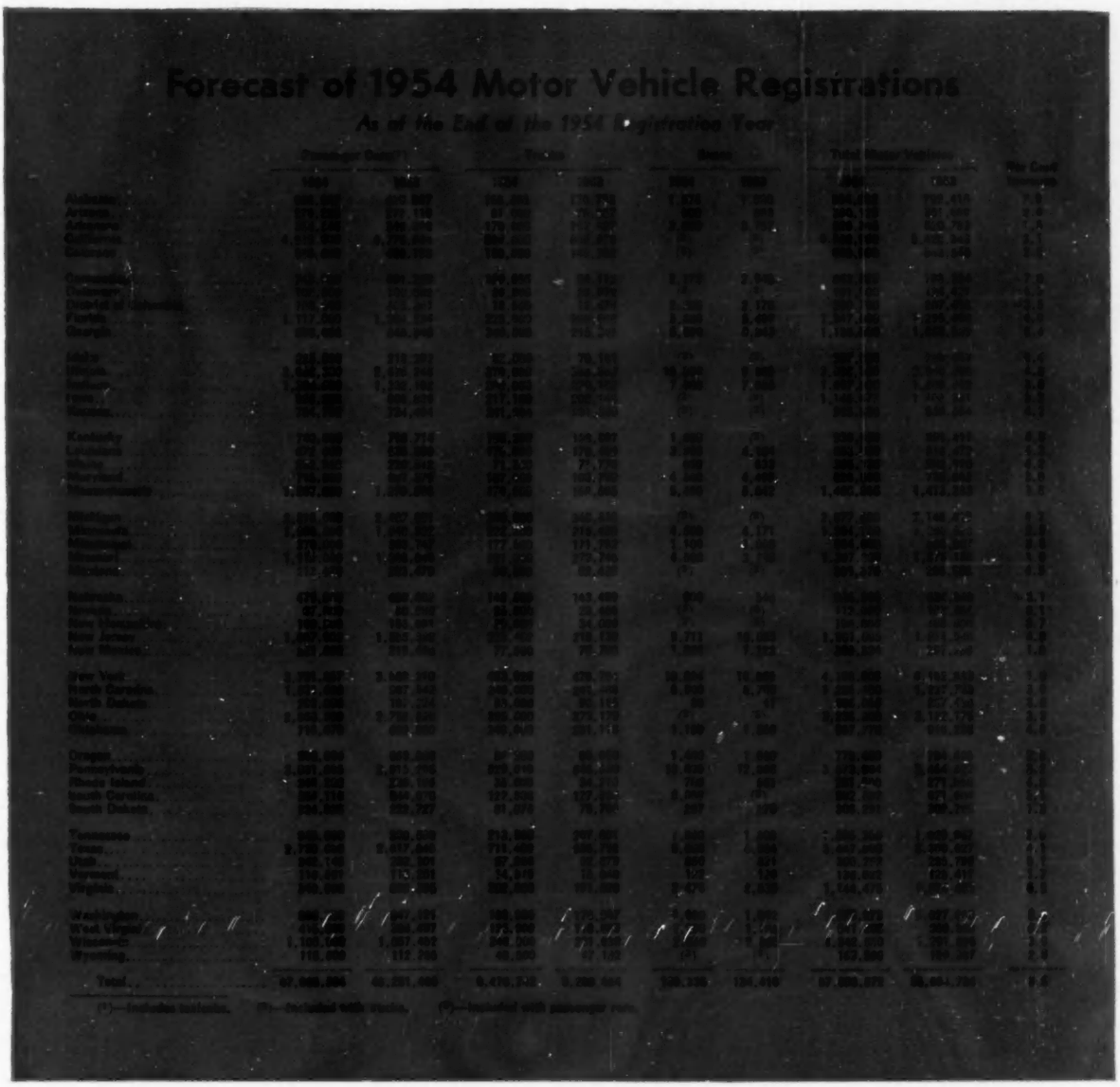
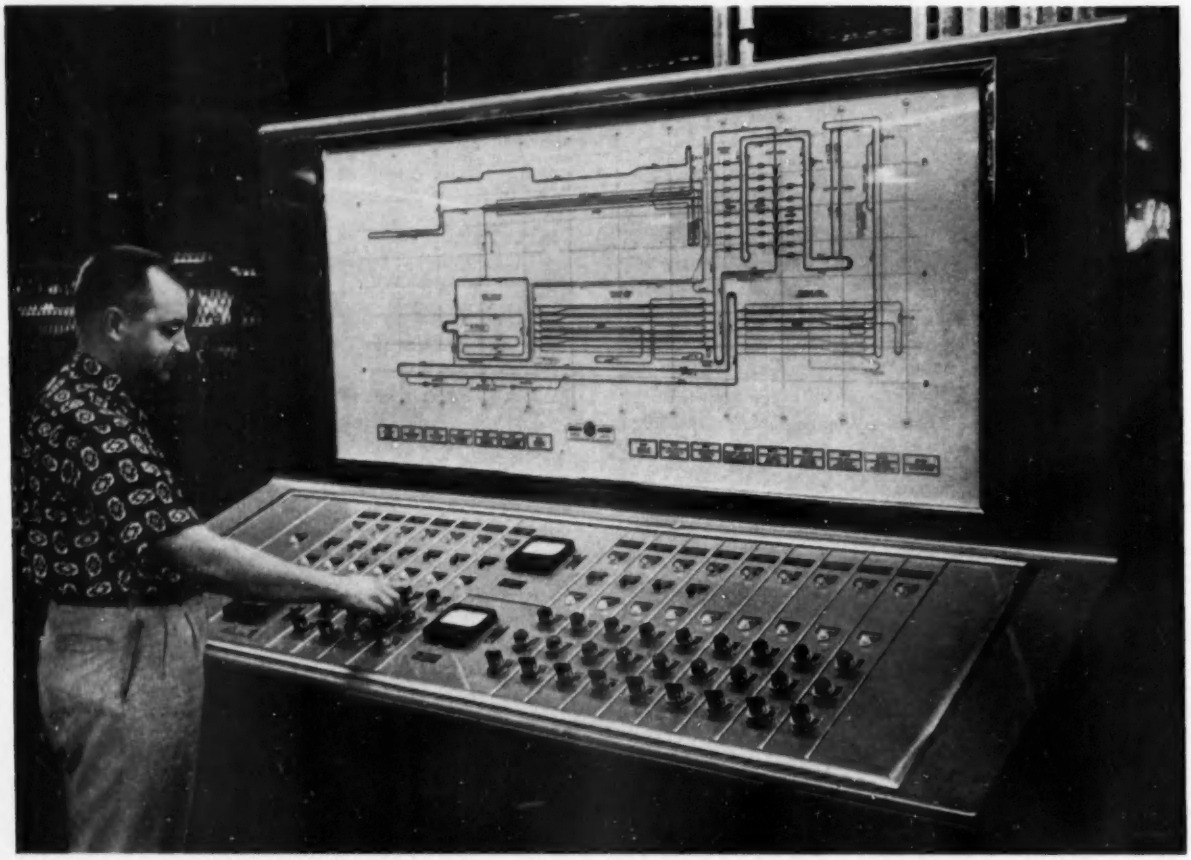


Forecast of 1954 Motor Vehicle Registrations

As of the End of the 1954 Registration Year



Control *Here is a close-up of the master control panel for the J. B. Webb power-and-free automation system described in this article. The vertical panel provides a visual outline of the complete network of conveyors serving assembly, with tell-tale lights for each line on the main panel. Synchronization of conveyor speeds is effected by the operator, and visually recorded on the meters.*

Transmission Automation With Power-and-Free Conveyors

By Joseph Geschelin

AUTOMATION is a dynamic concept. One of its basic characteristics is that each new installation profits by the experience gained in earlier designs, thus marking big forward strides each time. This is particularly true of the latest power-and-free automation system now in operation at the Livonia Automatic Transmission Plant of Ford Motor Co.

As will be described later, it links the transmission final assembly lines with parts feeder lines; transports assemblies to repair lines from assembly inspection, if needed; delivers them to storage banks ahead of final test for scheduling to the test machines; transports to the repair area from test, if needed; transports to the button-up lines after acceptance; delivers to the storage banks ahead of shipping; schedules to the shipping drops; returns the empty carriers to storage ahead of start of assembly.

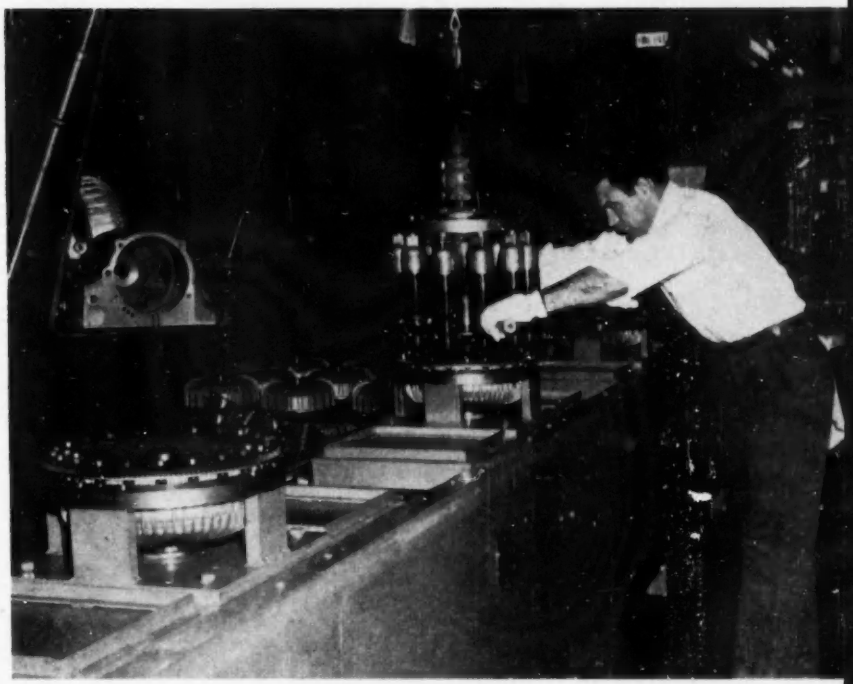
In its latest form, the power-and-free conveyor system embodies the latest developments in switches and accessories and centralized controls; and has

many features contributing to simplified maintenance.

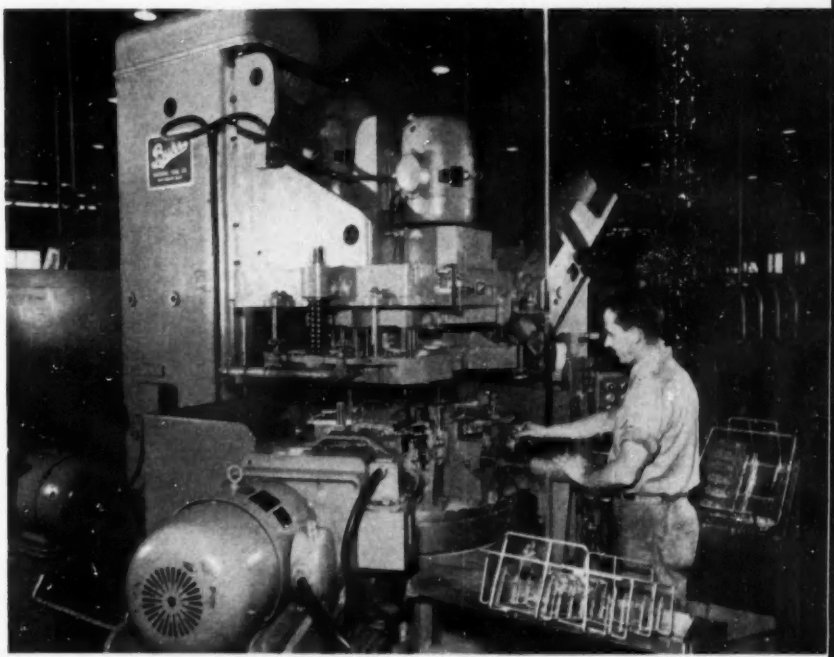
The Livonia plant originally was built to house manufacturing facilities for tanks. Consequently, it is a facility with some 1.5-million sq ft of floor space of which almost a million sq ft has been preempted for automatic transmission manufacture, leaving ample space for future expansion. Because of its original purpose, the plant has enormously high bays which now provide exceptional air circulation and freedom from pent up heat.

The layout contributes to fire protection. During changeover the entire floor area was blanketed with a sprinkler system, capable of handling any emergency. In addition, Ford has developed one of the most modern and certainly comprehensive heat treat departments, housed in a far corner of the plant isolated from the manufacturing departments. Although this arrangement is not as economical from the standpoint of material handling as would be a more central location, Ford is willing to compromise in return for safety. It may be noted briefly that heat treat comprises a major installation of Holcroft furnaces of various types; Surface Combustion furnaces, Lindberg furnaces, and induction hardening equipment fitted with automation. A battery of the familiar Gleason gear quenching machines also is found here.

The very nature of automatic transmission building has influenced floor plan arrangement. Not only is it departmentalized but the variety of materials—aluminum, cast iron, steel—has demanded their complete segregation in the interest of cleanliness as well as to facilitate segregation of scrap and turnings. One long, high bay is devoted exclusively to the automatic screw machine department. The long bay, containing a single row of Conomatics, National Acme-Gridleys, and New Britain-Gridleys is traversed by a heavy-duty chip conveyor, terminating at one end at facilities for centrifuging the cutting fluid, crushing the chips, and blowing chips into gondola cars on the siding.



Nut Running *Said to be the largest multiple nut runner found in the industry today, this Ingersoll-Rand pneumatic mechanism has 11 spindles. It makes up 22 fastenings in two stages.*



Drilling *One of a number of familiar special multiple-head, multiple-spindle Buhr machines at Livonia, this one is part of a battery in the aluminum machining department. It is set up for a variety of drilling operations on valve body parts.*

This is one plant where an analysis of facilities can be profitably made not in terms of individual machining operations but in terms of process. There is only one transfer machine, an enormous Snyder unit that handles all major operations on the transmission case.

However, processing includes — a gear department with two of the huge No. 10 Fellows gear shapers; two Shear Speed machines; hobbing machines; gear shaving equipment; an amazing variety of metal cleaning equipment; a variety of Norton lapping machines; Ex-Cell-O and Heald precision-boring machines; New Britain two-spindle boring machines; a variety of Gisholt Super-finishing equipment; Buhr multiple-head drilling machines; Kingsbury multiple-head drills; a large battery of Gardner grinders; a number of batteries of Roto-Finish wet tumbling barrels; Fay automatics of the latest high speed electronic type; Lo-Swing automatic lathes; Bullard Type K automatics.

In addition, there is an automatic Udylite plating type machine for anodizing aluminum parts; and a large, enclosed booth containing a variety of Pangborn shot blasting and shot cleaning equipment. This equipment is isolated to prevent contamination and noise.

Still other components, primarily those comprising the torque converters, are cleaned in special machines using corn cob or walnut grit.

Besides making all of the parts of automatic transmissions, the plant is equipped with a suitable press shop, including the familiar Henry & Wright dieing machine, and makes all of the stampings for torque converters and their parts.

It will be obvious that the establishment is much too extensive to permit even a highspotting of activity in a series of articles. Accordingly, this first installment will be devoted exclusively to the Jervis B. Webb power-and-free conveyor system; and some highlights of the Snyder transfer equipment. The rest will be covered in succeeding articles to be published later on.

The basic operation of the power-and-free system begins in the location where the empty carriers, scheduled from the storage lines on a delivery conveyor, are moved to the final assembly lines. Trolleys roll by gravity to a stop-and-feeder where they are released automatically when the loading station is free.

At this point the case is loaded into the fixture and clamped, the operator releases the trolley and it rolls to a position where it is engaged by the pusher dog of the final assembly line conveyor.

It may be well to digress at this point to draw attention to the carrier. Of latest type, it has a specially designed clamping arrangement with provision for quick clamping and unclamping. Each carrier is provided with an integrally-mounted selector switch having eight points, thus making it possible to route the carrier along any designated path as well as to divert its route at any stage. Another distinctive feature of the carrier is a dust-proof hood to prevent entry of dust or dirt or other contaminants while the transmission is being integrated.

Attention is drawn, too, to the arrangement of two final assembly lines, served by the monorail parts conveyor located between them. It is important to note that the parts conveyor is synchronized with the speed of the assembly lines and is controlled by the activity on the assembly lines.

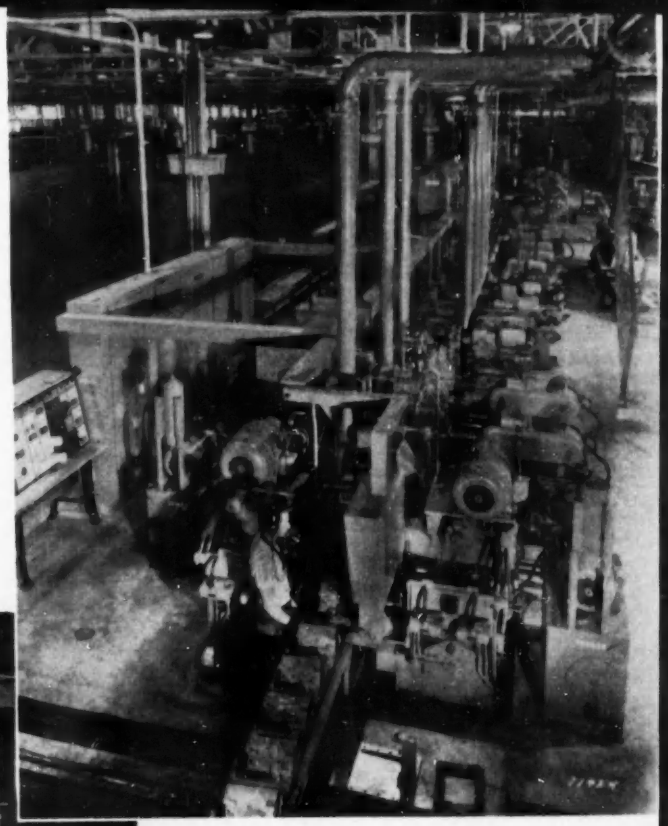
Returning now to the assembly operation—at the end of the line the operator turns the selector switch on the trolley to indicate the type of transmission, i.e., Ford, Mercury, or Lincoln. Or if the transmission

Testing *This shows one of the final testing machines. The assembled transmission has just entered the elevator or lift to an open test machine, and the operator is in the act of lowering the assembly by means of his manual control.*

is defective in any way, the switch is turned to "rework" position, being automatically shunted to the rework or repair spur. If the rework spur is filled, the carrier will by-pass it and continue through the system until it finds an empty rework station.

Following rework operations, the trolley is released and rolls by gravity to a stop-and-feeder which ejects it into the delivery conveyor to storage ahead of test. The same delivery conveyor receives trolleys from the assembly conveyors and delivers them to the designated storage conveyors through a system of pre-set selector operated switches. It is important to observe that transmissions are parked in this storage area in accordance with a predetermined ratio of the types of transmissions in process at the time. The trolleys then roll by gravity to a given position where they are engaged by the trip-dog of the storage drive conveyor. This conveyor then moves the trolleys toward the unloading end where they are stopped

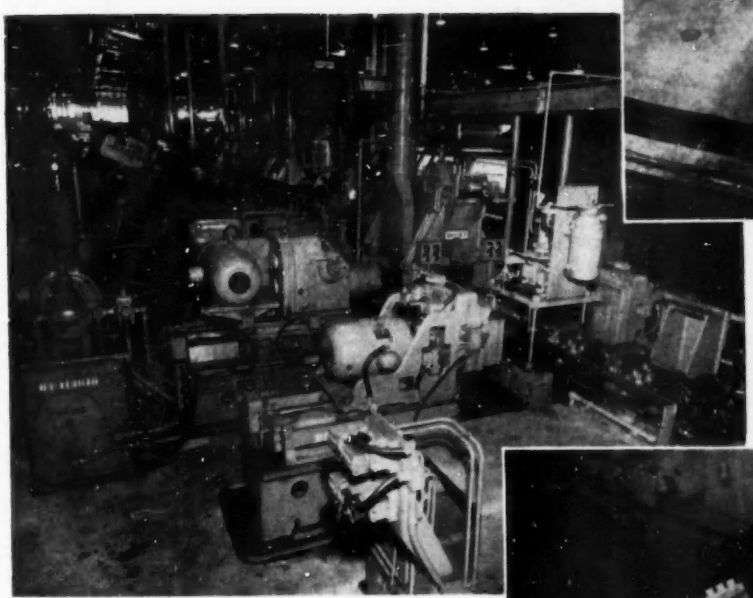
SNYDER TRANSFER EQUIPMENT



OVERALL VIEW

Machining

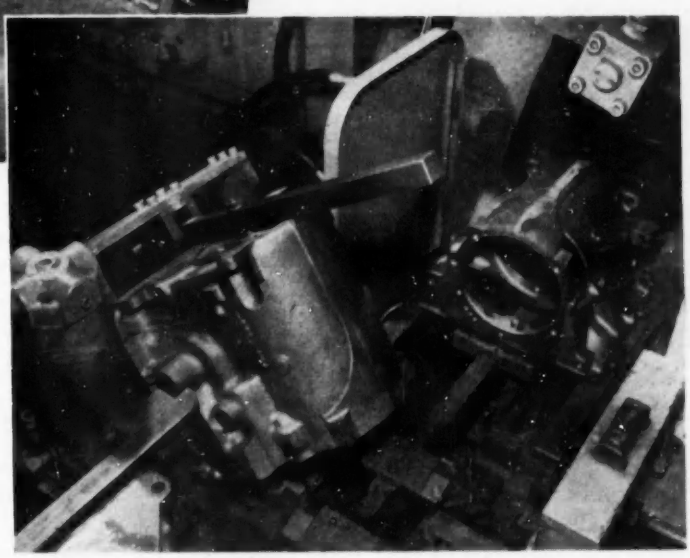
150-ft long installation of Snyder transfer equipment for transmission case machining, pictured before surrounding area was filled with machinery.



CLOSE-UP

Machining

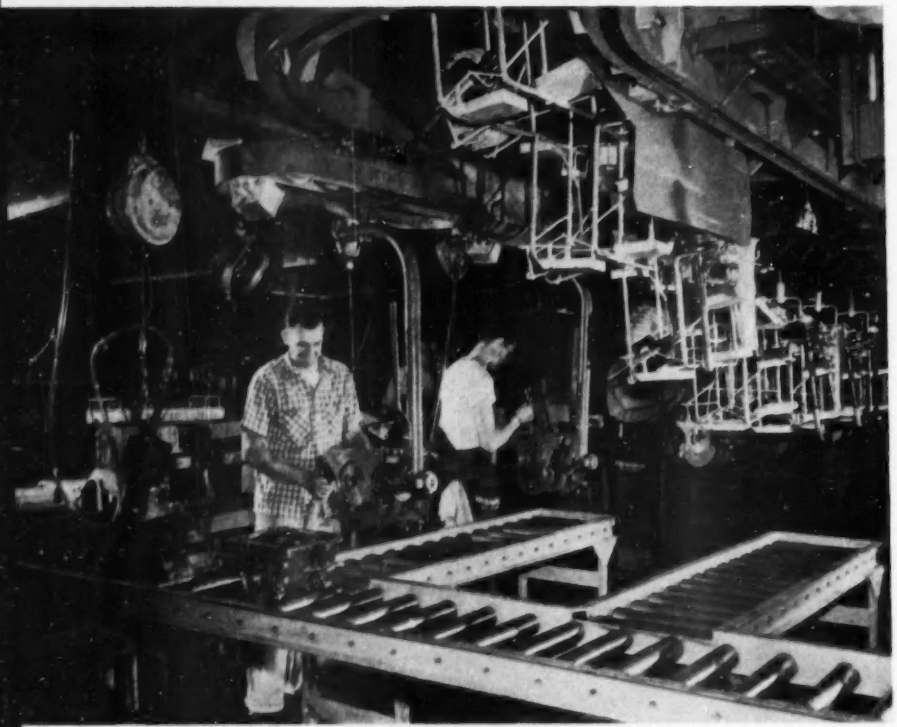
A close look at one section of the Snyder transfer machine, showing the flow of cases on the transfer conveyor. This shows, too, the accessibility of motor drives for each head; as well as the remote location of hydraulic mechanism serving each section.



CLOSER-UP

Turn-Over

Close-up of one of the simple automatic turn-over fixtures developed by Snyder for this equipment. As the case enters this station, it is clamped securely, supported by one or two vertical bars — one in this instance — turned over as required. This mechanism offers great contrast with the more complicated roll-over devices used heretofore, and represents one of the major advances in transfer machine simplification.



Assembly ***Automatic transmission assembly begins at this point. Here the cases, seen on the gravity roller conveyor, are mounted securely on the carrier for the start of final assembly operations. The case remains on its carrier until disengaged at the shipping dock.***

by a stop-and-feeder unit.

Whereas the storage ahead of test is scheduled on the basis of the ratio of each type of unit as produced on the final assembly line, delivery to the test stands may be at an entirely different rate, depending upon the rate of delivery to assembly plants.

At the present time there are 14 test stands installed, each one served by an individual drop station which lowers a carrier from the overhead conveyor line to the stand. The delivery conveyor plays a dual role: it receives carriers from the rework stands in cases where transmissions were rejected on final test and routed to rework; and transmission from the storage area. In either event, the trolleys roll by gravity from the delivery conveyor to a stop-and-feeder ahead of a test stand air lift. When the air lift is empty the trolley is released automatically, and rolls into position over the test stand. The operator then actuates the air lift to lower the trolley into position. At the completion of the test run the operator sets the selector switch to the type of unit in the fixture, if acceptable; or to rework position if it requires further adjustment. He then actuates the air lift to raise the trolley to its up position where it rolls by gravity to a stop-and-feeder which ejects it onto the delivery conveyor to "button-up."

The latter conveyor receives trolleys from either the test stand or by-pass spur and routes them according to the setting of the selector switch: If set for empty or button-up, the trolley goes to the button-up conveyors; if set for re-

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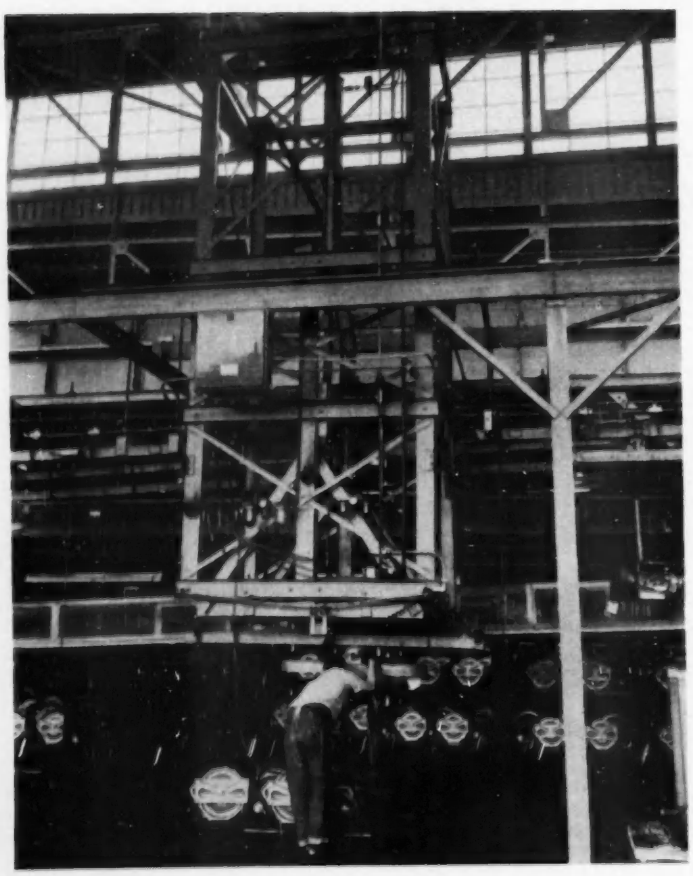
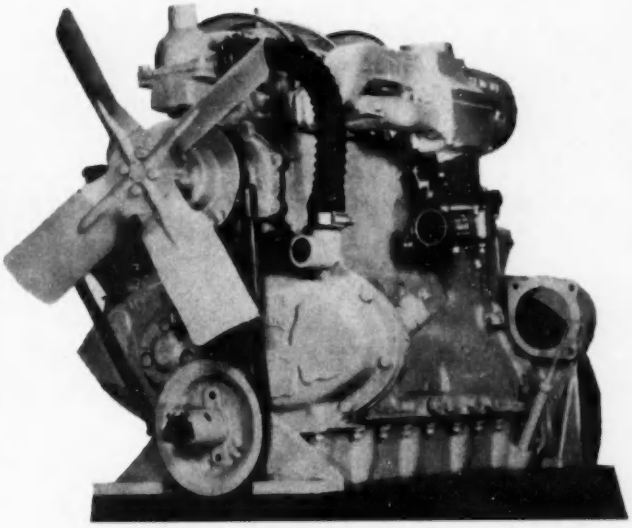


Shipping

A portion of the shipping bay, directly at the wide elevator. Accepted transmissions may be seen coming in on the conveyor from the right, having been scheduled from the storage bay ahead of shipping. As the assembly reaches the elevator it is under manual control: the operator moves it within the elevator in the proper position for loading the shipping carrier, seen on the floor, then lowers it into place.

Experimental Tractor Engine Has Compression Ratio of 12 to 1



The Oliver XO-1 four-cylinder tractor engine with 12 to 1 compression ratio

An experimental tractor engine with a compression ratio of 12 to 1 has proved to be a most useful research tool for the Oliver Corp. Known as the XO-121, it was developed by Oliver, assisted by the Ethyl Corp., to prove whether a tractor engine of advanced high compression design, using gasoline "ahead of tomorrow," would produce gains in power and economy that were attractive and sound.

Since the compression ratio of present Oliver gasoline tractor engines is 6.75 to 1, it was decided that rather than build an engine of 8 to 1 or 9 to 1, much more could be learned by going right past existing engines. The 12 to 1 compression ratio was selected as being far enough ahead of present engines to answer the question: Is high compression the route to follow for major improvements in power and economy?

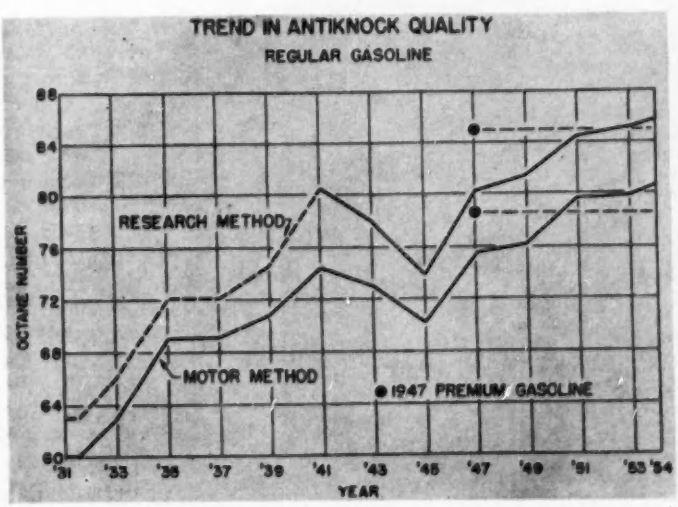
In designing the new unit, good structural rigidity was a prime requisite. Considerable attention was given to features influencing the breathing characteristics of the engine. Combustion chamber design is of the utmost importance.

(*Turn to page* 142, *please*)

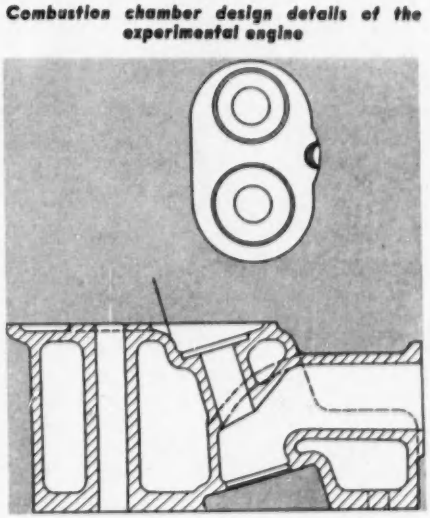
COMPARISON OF PERFORMANCE OF THE XO-121 WITH OTHER OLIVER TRACTOR ENGINES

Engine Dynamometer

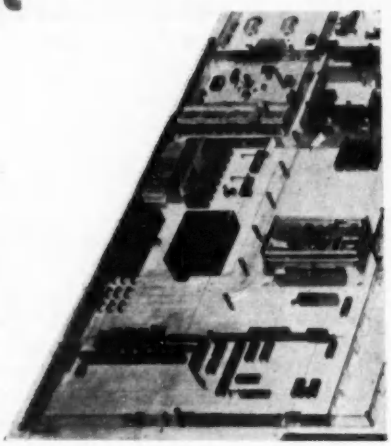
MODELS	70	77	XO-121
Displacement, cu. in.	201	194	199
Compression Ratio	6.50:1	6.75:1	12:1
Governed Speed, rpm	1500	1600	1600
BHP-100% Maximum Corrected	31.6	41.22	60.9
BHP-Operating Maximum Observed	28.4	36.4	54.0
Horsepower-Hours Per Gallon Operating Maximum	11.85	12.40	16.07



Combustion chamber design details of the experimental engine



Aircraft Production Under Way at New DeHaviland Plant in Canada

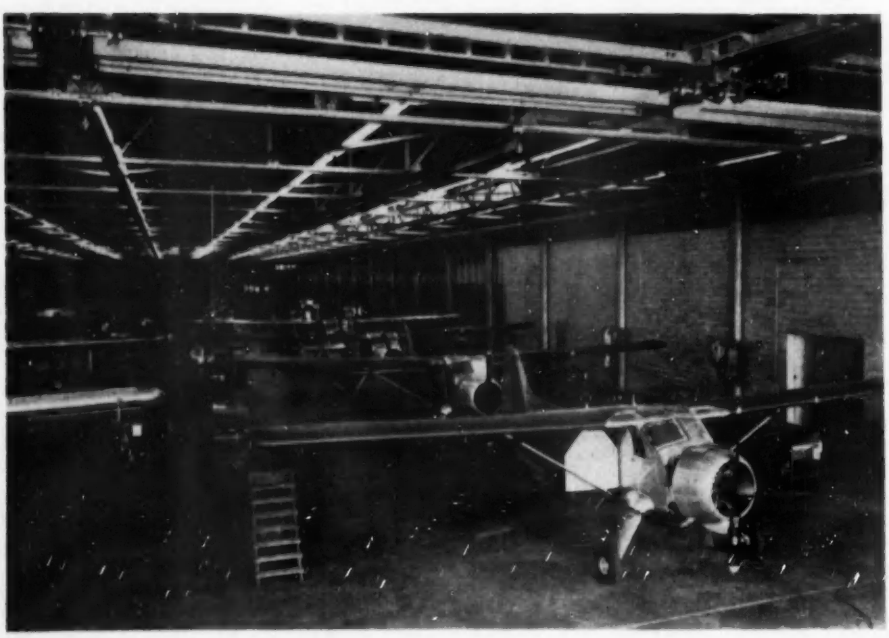


By James Montagnes

TORONTO, CANADA

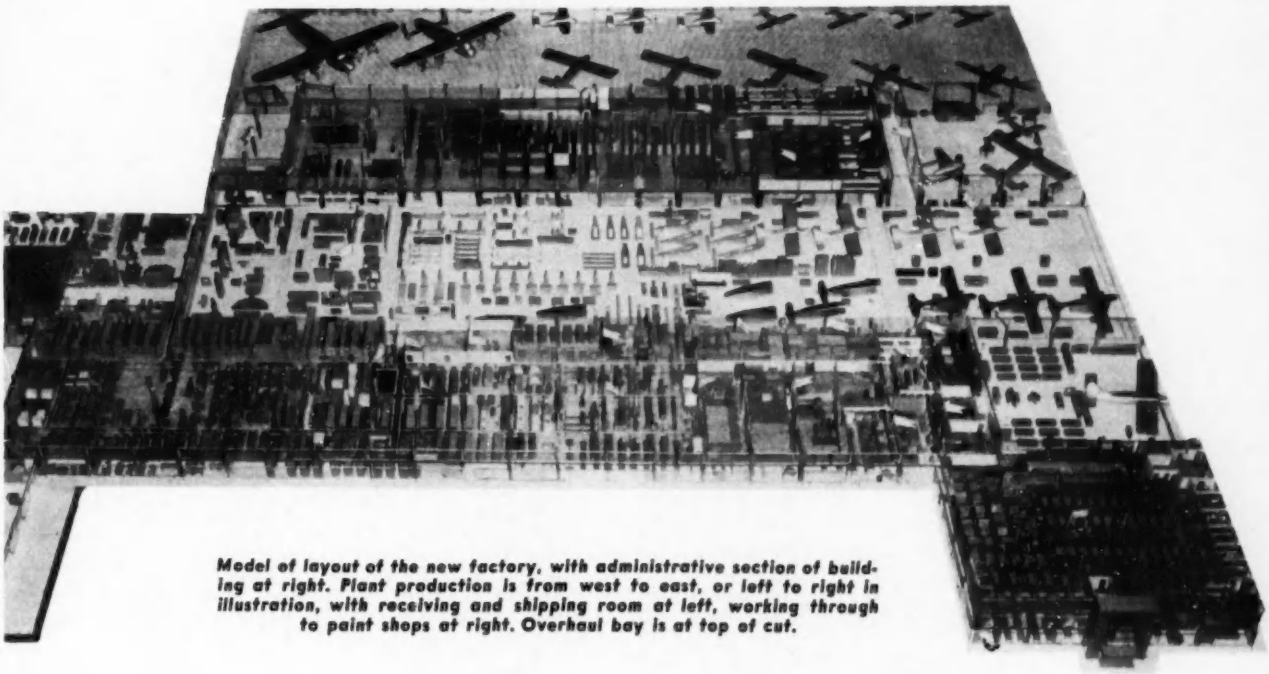
OLDEST of Canada's major aircraft companies, De Havilland Aircraft of Canada, Ltd., this past spring moved into a new $7 million factory at Downsview, in suburban Toronto. At the factory new production techniques and a west-to-east assembly line are in operation manufacturing aircraft for the United States Air Force, Royal Canadian Air Force, and the military and civilian air services of a number of other countries.

The new plant will soon be producing components for the Grumman S2F anti-submarine aircraft. De Havilland has a contract for 25 of these for the Royal Canadian Navy, and sub-contracts have been let to other Canadian companies for the wings and tail assemblies. In addition, it is producing one *Beaver* or L-20 single-engined transport daily for various governments and air services, one *Otter* single-engined 14 seat transport weekly for Canadian and United States Governments, and overhauling a large variety of civil and military aircraft ranging from trainers to the British De Havilland RCAF Comet I. Its overhaul bay in the new plant has been designed to handle the new British De Havilland Comet III jet transport, which is currently undergoing flight tests in England.



A section of the Beaver assembly line

De Havilland Aircraft of Canada has been in operation for over 25 years outside Toronto, and has made a wide variety of aircraft there. Two years ago the Canadian government decided to use the land on which the De Havilland plant was located for one of two major supply and overhaul bases, and the company had to give up its buildings. Arrangements were made for De Havilland to build a



Model of layout of the new factory, with administrative section of building at right. Plant production is from west to east, or left to right in illustration, with receiving and shipping room at left, working through to paint shops at right. Overhaul bay is at top of cut.

new plant at the southern end of the government's 1000 acre lot, and the buildings were occupied until the new plant was ready. The change from one plant to the other was made this past spring with a minimum loss of production time. Formal opening of the new plant was held September 29, 1954.

Before building its new factory, De Havilland officers studied aircraft plants throughout North America and Great Britain, coming up with many useful ideas which have been incorporated in the layout. This consists of a main factory with about 460,000 sq ft of floor space, mostly one story; a test hangar with 60,000 sq ft of floor space, and a separate cafeteria and recreation building for the more than 2200 men and women at the plant.

All equipment fr the plant's operations comes in at the west side of the factory. A new storage warehouse is now under construction. Railway cars can come right up alongside the building, with a space of only 18 in. between railway car and building. This permits ease in loading and unloading of box cars, and an overhead chain crane allows for handling heavy materials between shipping room and box cars, and for loading of railway flat cars.

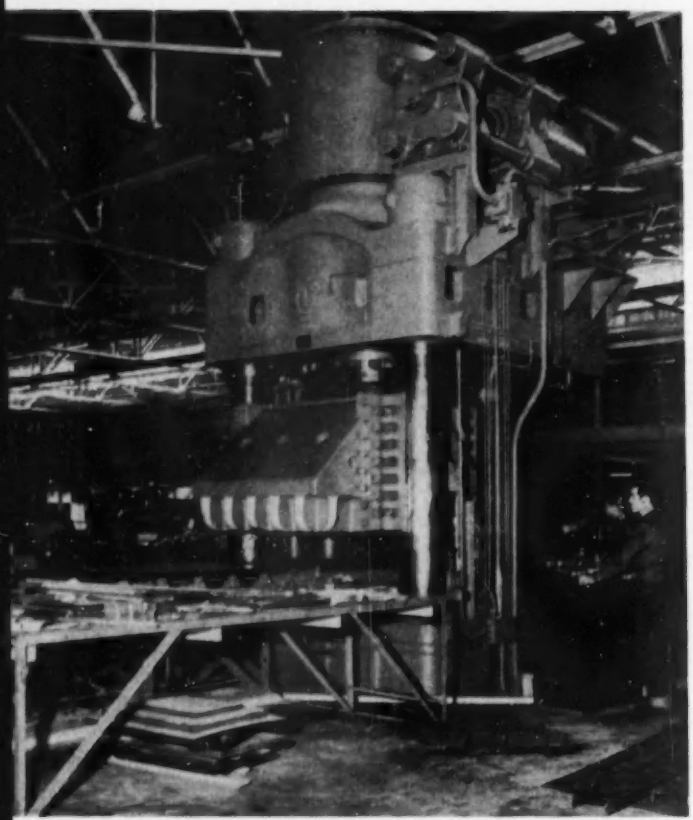
The shipping room has temperature insulation in the form of a double wall. This was specially designed for winter operations, allowing doors in inner wall to be closed while shipments arrive at loading dock located between inner and outer walls. When shipments are unloaded, doors on outer wall are closed, doors in inner wall are opened and material taken into the plant, with a minimum loss of heat from the shipping room.

Materials are moved from the shipping room to the various departments by overhead and traverse cranes, as well as by an hourly tractor-drawn train. This 16-car train operates on schedule throughout the plant. One man runs the small tractor, another loads and unloads the various tractor-drawn cars. Materials carried on these cars are marked with yellow paper slips for station numbers. Entire cars or just boxes with parts are unloaded at the various stations throughout the factory, and material is picked up all along the route for various destinations. This has proved a time and labor saver. Parts too big to be carried on this train, are carried on hand-pushed carts to various stations.

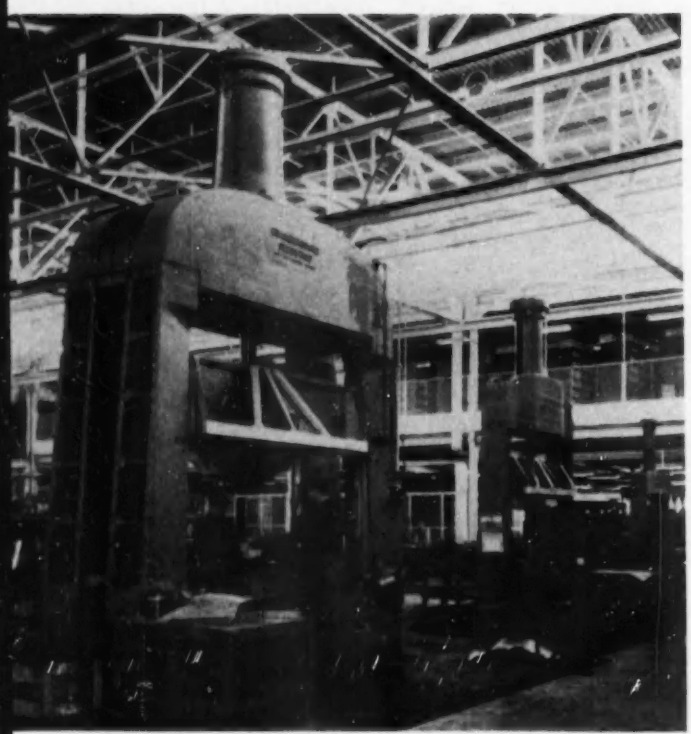
From the shipping room the plant is laid out in four main parallel bays, two of which have mezzanine floors and are used for manufacturing processes. The other two have full headroom and are used largely as assembly areas, one for the *Otter* and the *Beaver*, both postwar Canadian De Havilland designed transports. At the east end of this assembly area are the paint shops. The second assembly area is an overhaul section half of which will be used for assembly of the Grumman S2F aircraft when this starts sometime towards the end of 1955. There are power-operated metal and glass doors at both ends of the overhaul bay, and the outside wall of this area is built so that it can be easily removed for future expansion of the plant.

The plant also has an experimental shop for work on aircraft design, a closely-guarded shop where air-to-air guided missile research is being done, and an engine overhaul division where British, United States and Canadian jet aircraft engines are overhauled.

In the paint shop a water washed wall has been incorporated which uses chemically treated water to break up paint globules. The paint operators work in



New 3500 ton rubber press, made partly in Scandinavia and at Montreal.



Battery of 80, 50 and 30 ton Cocostamp hammers.

perfect freedom without any need of masks.

An International Business Machines system has been installed to give a daily vertical and horizontal analysis of shop loading. The daily analysis of actual jobs saves time for correcting shortcomings, and saves time in obtaining data which previously was available only through cost accounting procedures. The electronic machine analysis permits better scheduling of all operations, De Havilland Canada engineers explained.

In the various shops some labor-saving devices have been developed. Included among these is a drill and scribe template made of glass reinforced fibre instead of metal. It serves as a template and has anchor nuts with the nuts removed and replaced with drill bushings at points where drilling is necessary on the form to be made on this template.

Another template developed uses magnets instead of clamps. This template is used for scribing and cutting metal sections. The magnets are held in place on steel bars and can be used on a variety of templates instead of clamps to hold forms in place.

Special forms have been developed which allow four or five reverse bends to be made in material on a Hufford stretch forming machine. Previously it was necessary to make each bend separately, then weld all together to make the former with a number of reverse bends. Now one long piece of aluminum can be bent into a number of reverse bends by using the stretch forming machine and the special hand operated reverse bend forms. Plant engineers have also found a way to put a wind on stretched material.

On the Grumman contract, white metal plates with component part drawings have been imported. To make loft templates from these, plant engineers are printing from the white metal plates in reflex on fibre glass cloth, and then printing for a positive tool template on sensitized metal. By this means the plant is saving time in making tool templates which otherwise would have had to be copied in the drafting room and then printed on sensitized metal.

The plant is using an increasing amount of plastic material to make aircraft components. Currently being made of fibre glass cloth impregnated with plastic are heating ducts, tail skis, spinners, wing tips and numerous small objects. The fibre glass cloth is wound around forms, and then impregnated with liquid plastic. To accelerate curing time the plastic parts are placed in a heating oven if necessary.

Use is made of short cuts and labor saving devices throughout the plant. Included is a reversible conveyor belt from one floor to another in the parts manufacturing section. Various tubular jibs have been built to permit a number of workmen to work on one assembly, such as the cockpit of the *Beaver*.

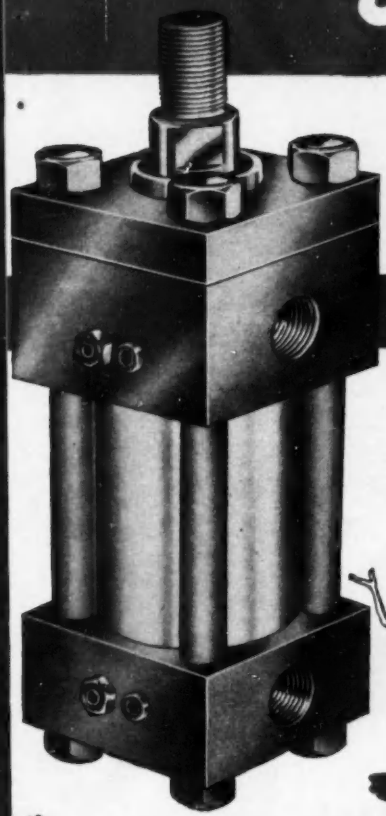
(*Turn to page* 134, *please*)

Augmenting Miller's Quality-Famous Line of "Custom-Built" Cylinders...

Miller Stock AIR AND HYDRAULIC CYLINDERS

Available for *Immediate Delivery*...

in the popular sizes, mountings and prices listed below



Any of the *Interchangeable* "Stock" Mountings illustrated are attached by our factory to the "in-stock" Basic Model 53 with the tie rod nuts in a few moments. This gives you a selection of over 500 different "Stock" Cylinders for *immediate use*—and permits easy conversion to other models for *future re-use*. Thus, you save delivery and production time, investment cost and storage space.

Additional sizes of Stock Cylinders are being added daily, considerably augmenting the list below. Write for complete list.

PRICES OF MILLER "STOCK" CYLINDERS WITH MOUNTINGS ATTACHED AS ILLUSTRATED

(Prices on the separate mounting attachments for future re-use are available on request)

ORDER DIRECTLY FROM THIS LIST . . .

Shipment can be generally made within 24 hours after we receive your order. Prices are F. O. B. our plant.

			Basic Model 53		Model 77	Model 61	Model 62	Model 65	Model 66	Model 86
			Tie Rod Mounting		Foot Mounting	Rod End Flange	Cap End Flange	Rod End Flange	Cap End Flange	Pivot Mounting
Bore	Stroke	Cushion	AIR A53	HYD. H53	AIR A61 A77	HYD. H61 H77	AIR A62	HYD. H62 H65	AIR A66	HYD. H66 H86
1½"	2"	Non		$ 58.50		$ 61.40		$ 66.70		$ 72.85
1½"	4"	Non		60.70		63.60		68.90		75.05
1½"	6"	Non		62.90		65.80		71.10		77.25
1½"	8"	Non		65.10		68.00		73.30		79.45
1½"	11"	Non		68.40		71.30		76.60		82.75
2"	2"	Non	$ 37.70		$ 39.75		$ 42.30		$ 44.60	
2"	4"	Non	39.40		41.45		44.00		46.30	
2"	6"	Non	41.10		43.15		45.70		48.00	
2"	8"	Non	42.80		44.85		47.40		49.70	
2"	11"	Non	45.35		47.40		49.95		52.25	
2"	3"	Both	62.05	94.50	64.10	97.45	66.65	103.05	68.95	111.55
2"	5"	Both	63.75	97.00	65.80	99.95	68.35	105.55	70.65	114.05
2"	7"	Both	65.45	99.50	67.50	102.45	70.05	108.05	72.35	116.55
2"	9"	Both	67.15	102.00	69.20	104.95	71.75	110.55	74.05	119.05
2"	13"	Both	70.55	107.00	72.60	109.95	75.15	115.55	77.45	124.05
2½"	2"	Non	41.45	73.30	43.70	76.25	46.25	82.30	49.00	93.10
2½"	4"	Non	43.35	76.00	45.60	78.95	48.15	85.00	50.90	95.80
2½"	6"	Non	45.25	78.70	47.50	81.65	50.05	87.70	52.80	98.50
2½"	8"	Non	47.15	81.40	49.40	84.35	51.95	90.40	54.70	101.20
2½"	11"	Non	50.00	85.45	52.25	88.40	54.80	94.45	57.55	105.25
3¼"	3"	Both	77.80	126.85	80.35	131.20	84.15	138.60	87.70	149.95
3¼"	5"	Both	79.80	129.85	82.35	134.20	86.15	141.60	89.70	152.95
3¼"	7"	Both	81.80	132.85	84.35	137.20	88.15	144.60	91.70	155.95
3¼"	9"	Both	83.80	135.85	86.35	140.20	90.15	147.60	93.70	158.95
3¼"	13"	Both	87.80	141.85	90.35	146.20	94.15	153.60	97.70	164.95
4"	2"	Non	56.25	106.00	59.10	111.15	62.95	118.90	67.30	132.80
4"	4"	Non	58.85	109.40	61.70	114.55	65.55	122.30	69.90	136.20
4"	6"	Non	61.45	112.80	64.30	117.95	68.15	125.70	72.50	139.60
4"	8"	Non	64.05	116.20	66.90	121.35	70.75	129.10	75.10	143.00
4"	11"	Non	67.95	121.30	70.80	126.45	74.65	134.20	79.00	148.10
5"	3"	Both	98.25		101.40		105.25		110.60	
5"	5"	Both	101.65		104.80		108.65		114.00	
5"	7"	Both	105.05		108.20		112.05		117.40	
5"	9"	Both	108.45		111.60		115.45		120.80	
5"	13"	Both	115.25		118.40		122.25		127.60	
6"	2"	Non	80.60		83.95		87.85		94.15	
6"	4"	Non	84.90		88.25		92.15		98.45	
6"	6"	Non	89.20		92.55		96.45		102.75	
6"	8"	Non	93.50		96.85		100.75		107.05	
6"	11"	Non	99.95		103.30		107.20		113.50	
8"	3"	Both	157.35		161.05		167.90		174.95	
8"	5"	Both	162.45		166.15		173.00		180.05	
8"	7"	Both	167.55		171.25		178.10		185.15	
8"	9"	Both	172.65		176.35		183.20		190.25	
8"	13"	Both	182.85		186.55		193.40		200.45	

Miller "Stock" Cylinders fully meet the J.I.C. Standards and are identical to Miller "Custom-Built" Cylinders in design and construction.

"Stock" Air Cylinders are for 200 psi operation, "stock" hydraulic cylinders for 2000-3000 psi operation. Piston Rods of "Stock" Cylinders are "Style No. 2 Standard."

For complete descriptive and dimensional data on both "Stock" and "Custom-Built" Miller Cylinders, write for Bulletins A-105 and H-104 sent FREE on request.

Sales and Service From Coast to Coast!

Consult your local directory or write us direct for the name of our representative for your area

"Stock" Boosters, Tool Immediate delivery on Miller Dual Pressure Boosters; 5" bore, 1" ram (80 psi air input produces 2000 psi hydraulic output for driving one or more work cylinders simultaneously). In 6" and 12" strokes. Write for data and prices.

Complete Miller "custom-built" line includes: air cylinders, 1½" to 20" bores, 200 psi operation; low pressure hydraulic cylinders, 1½" to 6" bores for 500 psi operation, 8" to 14" bores for 250 psi operation; high pressure hydraulic cylinders, 1½" to 12" bores, 2000-3000 psi operation. All mounting styles available. Also, a complete line of Fluid Pressure Boosters and Accumulators.

Miller

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COUNTERBALANCE CYLINDERS

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Garrett carries millions of standard and special washers in stock ready for immediate shipment. Garrett engineers are ready to aid you in solving any problem you may have involving the application of washers.

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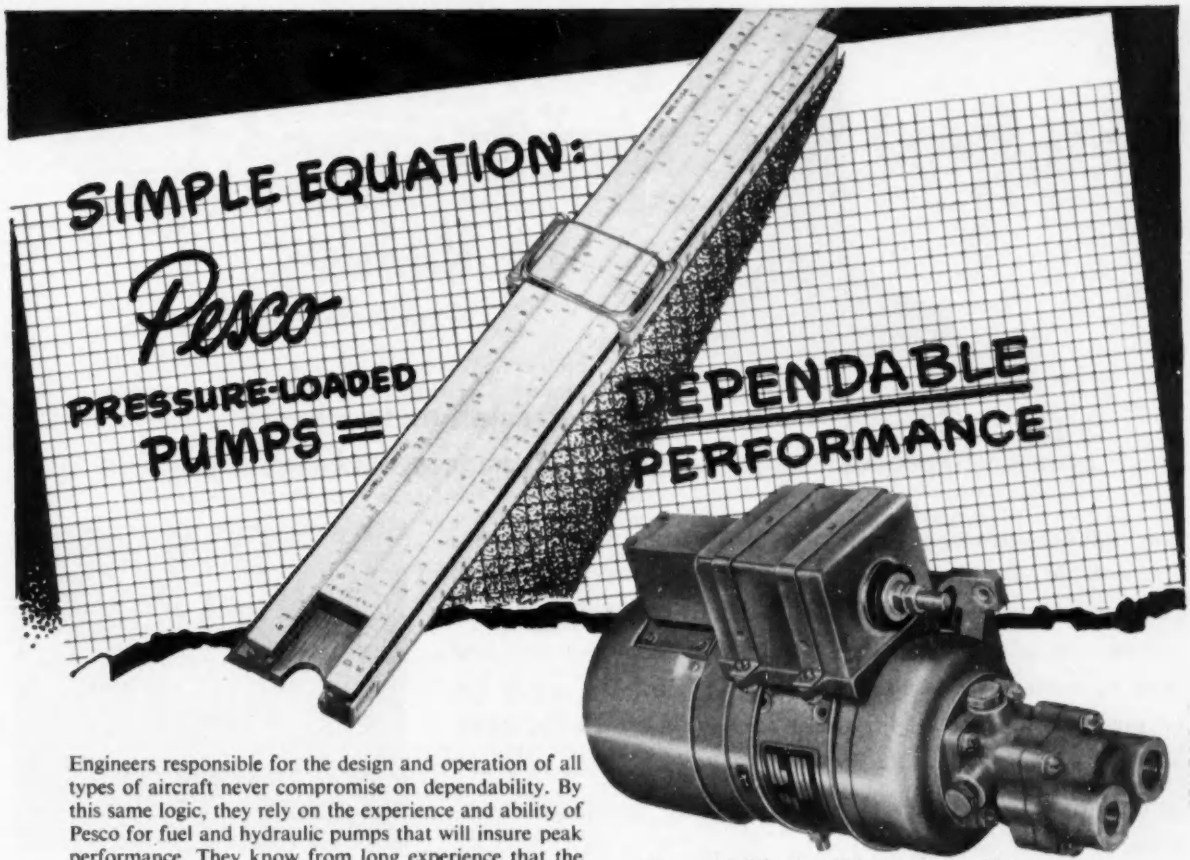
MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF WASHERS



Engineers responsible for the design and operation of all types of aircraft never compromise on dependability. By this same logic, they rely on the experience and ability of Pesco for fuel and hydraulic pumps that will insure peak performance. They know from long experience that the dependability of Pesco products results from several factors—all of them important to aircraft design and operation.

First there is Pesco experience. Since 1933 Pesco has concentrated its full facilities on the continuous development of aircraft pumps, motors, and accessory equipment. The successful solution of thousands of pumping problems has provided Pesco with unmatched "know-how" in pump design, characteristics, and application.

Then there are Pesco engineering and research—continuous and complete services using advanced technology in both design and materials to provide improved products and solutions to pumping problems.

And finally there are Pesco production facilities—geared to produce precision units in volume. High-precision machines and advanced production and testing techniques are reflected in the consistently high quality of all Pesco products.

These same Pesco advantages can be used to solve your specific pumping problems successfully. Simply call or write the Home Office, Bedford, Ohio.

Pesco Model No. 111530 Electric Motor-Driven Hydraulic Pump with 0.056 cubic inch displacement. 1.3 gpm @ 3000 psig, 26 Volts. Weight 28 lbs.

YOU CAN RELY ON

PESCO *Pressure Loaded* PUMPS

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DEPENDABLE PERFORMANCE
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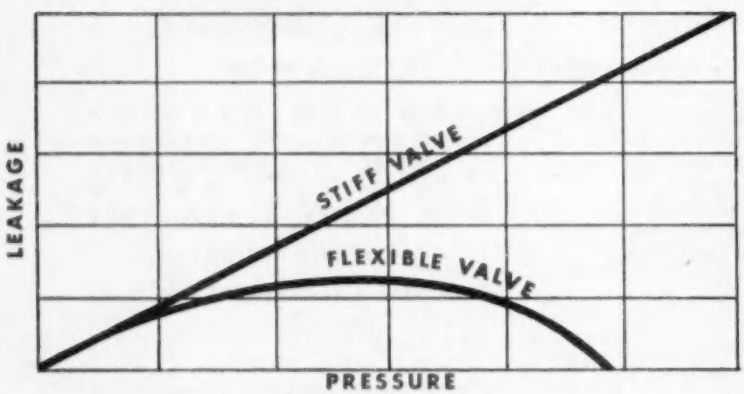
The New "Long Mileage Look" in Valves

Flexible design and high strength materials can provide improved sealing, better performance, and higher mileage

The higher outputs, greater load factors, and lean mixtures encountered in modern engines are all making greater demands on valves. By utilizing high hot strength materials, valves may be designed that flex from cylinder pressure and tend to conform to a distorted cylinder seat. The result can be greatly improved sealing, maintained engine performance, and higher mileages.

Eaton engineers welcome an opportunity to discuss your valve problems with you.

Typical seat condition in stiff valve, caused by imperfect sealing. Result: poor performance, low mileage.



Leakage Test on Distorted Cylinder Head Seat: With stiff valves, leakage increases in direct proportion to cylinder pressures. With flexible valves, leakage is reduced to zero when cylinder pressure increase produces valve conformity.

Typical flexible valve under comparable operating conditions. Result: Improved sealing assures better performance and longer mileage.

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MANUFACTURING COMPANY
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PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

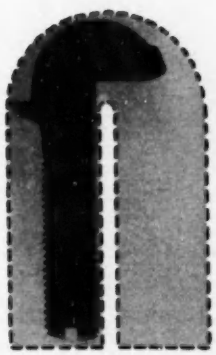
Eight operations cut to four

The old way:

The stud shown here was used by a tank manufacturer to blind feed into a tubing hole during assembly. Multiple diameters were required to hold the stud tight after insertion. To achieve this rather intricate shape, eight operations were originally required . . . until National was asked to study the problem.

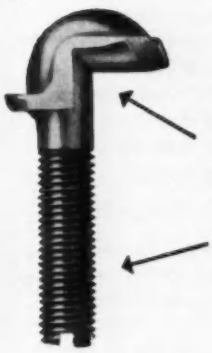
The National way:

Our "Special Products Service" showed this manufacturer how the stud could be produced to specifications *in only four operations* by cold-heading. Because National had the wide range of cold-heading equipment and specialized know-how needed to do the job, production costs were cut 50% . . . and substantial material savings resulted because cold-heading leaves a minimum of scrap.



OLD WAY

Bar stock bent in U-shape was machined to specifications in eight operations, with considerable waste of metal.



THE NATIONAL WAY

Head was upset into shape needed with multiple diameters.

Only four operations needed to complete stud by cold-heading and roll threading.

Bring your "Special" problems to National

Can we help you realize the same type of economy on *your* special fastener needs? Our "Special Products" representative will be glad to study your specifications. Write for free copy of National's "Special" fastener booklet.

Representatives in:
Chicago, Cincinnati, Detroit, New York, Philadelphia, Kansas City, Milwaukee, Rochester, Denver, St. Louis, San Francisco and Seattle.

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National PRODUCTS

Fasteners Hodell Chains Chester Hoists

Here's the modern way to end lubrication troubles —install Farval

FARVAL—
Studies in Centralized Lubrication
No. 163

WHAT if your oiler uses the wrong oil or grease? Or maybe he's in a hurry and forgets a few bearings. Whatever the error, bearings may be ruined. A machine is down and expenses begin. All such troubles can be avoided by installing Farval Centralized Lubrication.

With Farval a measured amount of the *right* lubricant is hydraulically delivered whenever needed to the bearings of a machine. *No bearings are ever missed!* A "tell-tale" indicator at each bearing gives *positive proof* that the measuring valve has functioned and that the bearing has received the lubricant it needs.

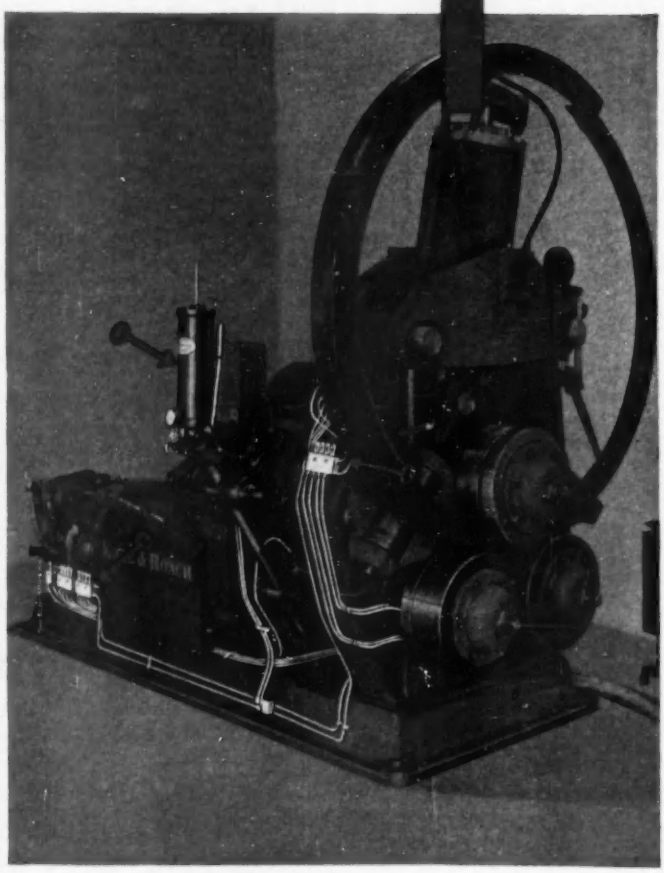
Kane & Roach Installs Farval

This Kane & Roach Vertical Angle Bender is an excellent example of how one modern machinery builder protects his equipment from "human" error. According to this builder, the cost of just *one* shutdown due to haphazard lubrication would exceed the entire cost of its protective Farval system. With Farval installed, this machine can perform efficiently, with no danger of bearing failure. In addition, Farval saves oiling labor and lubricant!

Free Lubrication Survey

Why not let us send a Farval engineer to inspect your plant equipment? Without obligation, he will present a written analysis of how Farval can end your lubrication troubles. Write also for Bulletin 26 for the complete Farval story. The Farval Corporation, 3296 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



KEYS TO ADEQUATE LUBRICATION—Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.

Pictured is a *Farvalized* Kane & Roach Vertical Angle Bender (Model 23) used for bending angles, channels, rounds, squares and other shapes.

News of the MACHINERY INDUSTRIES

By Thomas Mac New

Office of Defense Mobilization Should Keep Control of Leasing of Government-Owned Machine Tools According to Herbert L. Tigges, President of NMTBA

Machine Tool Show for '55

The 1955 Machine Tool Show sponsored by the National Machine Tool Builders' Association will be held at the International Amphitheater in Chicago, Sept. 6-17 inclusive. All exhibitors, exclusive of the trade press, will be American machine tool builders and will exhibit machine tools only. There will be no foreign equipment displayed.

Having over 150 exhibitors, it will constitute the largest exhibit of machine tools ever held under one roof. In conjunction with the Machine Tool Show, the Production Engineering Show will be held at the Navy Pier in Chicago. This show will be devoted to an exhibit of mechanisms, instruments, and equipment that contribute to greater production. Both shows will be under the management of Clapp & Poliak, who have managed all previous machine tool exhibitions in 1927, '29, '35 and '47. To house the Machine Tool Show, a new extension of 188,000 sq ft has been added to the International Amphitheater, giving the machine tool exhibits a total floor area of 428,000 sq ft.

Chairman of the show committee for the NMTBA is William J. Rutz, executive vice-president, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. The slogan for the show is "The World's Best Investment in Action." All machines as far as possible will be in operation.

Wants Control of Government Leasing

Since the Federal Government owns the largest machine tool reserve in the country, Herbert L. Tigges, president of the National Machine Tool Builders' Association, and executive president, Baker Bros., Inc., Toledo, stated that the control of the leasing of Government-owned machine tools by the Army, the Navy and the Air Force instead of by the Office of Defense Mobilization might dissipate the nation's machine tool reserve and endanger the safety of their country. Mr. Tigges, speaking before the fall meeting of the American Machine Tool Distributors' Association in Cincinnati, said that under the Vance plan, Government-owned machine tools useful for defense production are to be retained by the Government as a national defense reserve.

It was further stated that there is being discussed in Washington today a change in policy which might seriously impair the machine tool reserve. The suggestion is now being made that control of the actual leasing of Government - owned machine tools should be turned over to the individual military services under blanket authorization from the Office of Defense Mobilization.

Under such circumstances, if a military branch had no immediate need for a machine tool and if it did not have the funds to properly warehouse the equipment, leasing would be a tempting immediate solution. It was stated by Mr. Tigges that if the practice should gain headway among all three of the defense services, it would only be a matter of time until the machine tool reserve being built up for the national defense would be scattered throughout the country. Of course, if something of this nature should occur, it would be a tremendous job to relocate the equipment in time for immediate military output.

Mr. Tigges strongly recommends that the control of leasing of Government-owned machine tools should be kept in the hands of the ODM, since this agency is not subject to the same type of budget pressure as are the three fighting arms, and it is committed to the policies and objectives of the Vance plan.

Isotope Study

The Council for Technological Advancement has recently prepared an 11-page study of industrial participation in atomic energy development. This study shows that private industry can be expected to take an increasingly important part in the atomic energy program and continue to contribute significantly to its development. This work was made possible by the passage of the 1954 atomic energy act which broadens and encourages private participation in the development of peacetime atomic wants.

Industry to date has approximately 1000 users that are sponsoring private research programs for the use of atomic energy.

According to the CTA, capital goods manufacturing companies in particular have had an important part in developing the atomic energy program. A major factor here is that all major productive facilities of the AEC have been designed, built, equipped, and operated by private industrial concerns. In addition, certain equipment manufacturers have established divisions or departments for development of new machinery and equipment for nuclear power installations.

A new market has opened up because of the need of radiation instruments and special machines to users of atomic energy. This market, which was virtually non-existent in 1946, now boasts annual sales of $35 million.

Die Maker Eyeing Automotive Market

Efficient Tool & Die Co. has just announced the start of construction of a second plant in Cleveland. This modern 30,000 sq ft plant will be located on Old Brecksville Road, a short distance from downtown Cleveland.

Housed in the new building will be a complete die and Keller model department, engineering department, and die tryout facilities for large sheet metal dies, as large as those required for automobile quarter panels.

Until a few years ago Northern Ohio's contract tool and die makers were not faced with any appreciable demand for dies of such size as are now being provided for. Since practically all large automobile stampings were made in Michigan, most large body dies were made and serviced there. However, since the invasion of Cleveland by some of the large automotive manufacturers, there is a definite need for building and trying-out large tools in that area.

When the new plant is completed,

(*Turn to page* 164, *please*)

NEW EQUIPMENT PLANT • PRODUCTION

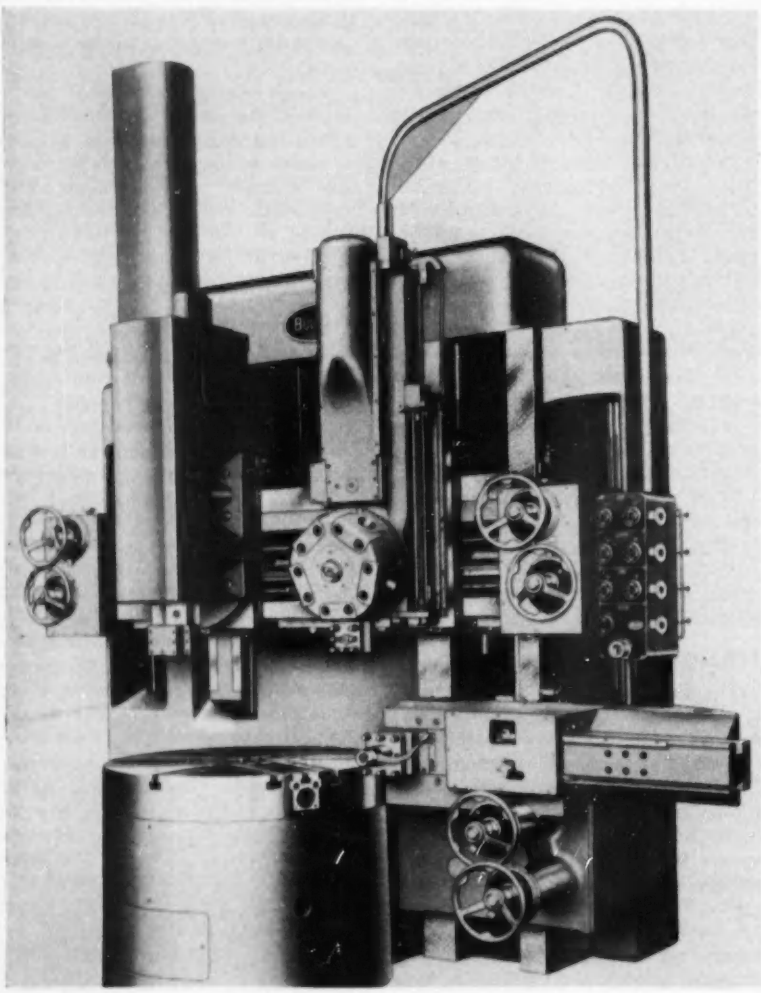
FOR ADDITIONAL INFORMATION, please use reply card on PAGE 89

Vertical Turret Lathe Re-Engineered for Ease of Control

A COMPLETELY redesigned version of a series of side-head vertical turret lathes is being announced this month. This series is the first of the company's full product line to come into production, basically improved for 1955. Known as the Cut Master Model 75, the new machine is operated by a hydraulic shifter unit.

All functions are controlled from a pendant station which can be power raised or lowered, and which can be swung in an arc and pivoted to a convenient location. In addition, a redesigned Man-Au-Trol attachment (not shown) is available to provide a fully automatic cycle with up to 49 steps. Any function the machine is capable of performing can be controlled by this attachment. The new Man-Au-Trol operates with drum cams and a punched drum, all three of which are removable. One set may be programmed while another set is operating the machine.

The Bullard Cut Master Model 75 vertical turret lathe.



Hydraulic and lubricating systems are completely separate. This means that optimum fluids may be used for each service. Pressure lubricated anti-friction bearings support all headstock shafts. One-shot lubrication for the ways is provided.

Castings are heavier and more rigid than on the current line. Ways are wider, and are of square lock rather than dovetail construction.

The headstock, feed works and hydraulic shifter units are assembled as a compact unit within the bed. A separate feed works for each head is geared directly to the headstock. Sixteen speeds and 20 table feeds are available from constant-mesh gears.

The turret head consists of a saddle, swivel, turret slide and five-sided turret. An optional power index is offered. The ram head consists of a saddle, swivel and octagonal ram. Both heads can be swiveled 30 deg either side of vertical, to within an accuracy of two minutes of arc. The side head is capable of vertical and horizontal cutting operations simultaneously with those of the vertical heads. A four-sided indexing turret is operated by hand. Various combinations of heads are available on the 26, 36, 46, 56, 66 and 76-in. machines.

A cutting coolant system includes guards around the base of the machine (not shown).

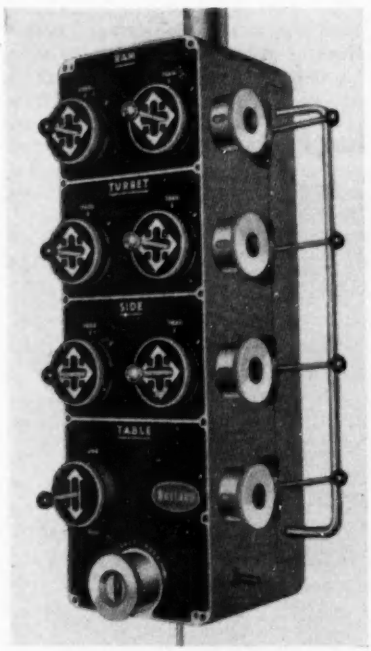
The electrical control panel is mounted in a compartment cast into the bed, at the back. The equipment meets all JIC standards. Recommended power is 30 to 50 hp.

For ease of cleaning and maintenance, exposed piping and wiring has been reduced to a minimum. Accessibility has been retained by mount-

ing control components and other parts on manifolds wherever possible.

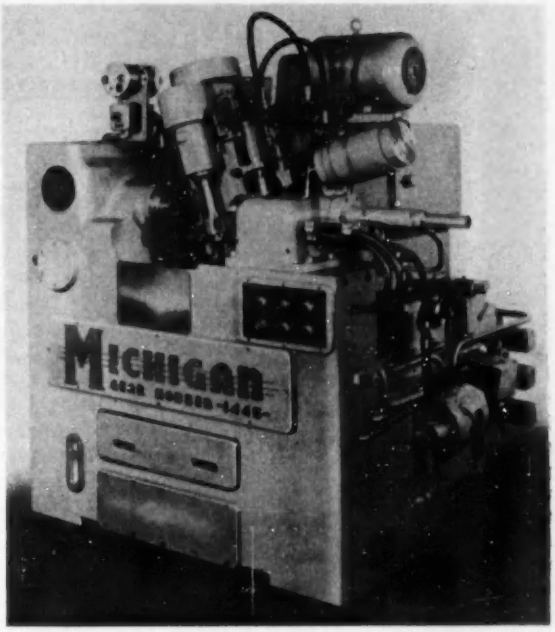
Safety interlocks are provided as required. For instance, it is impossible to engage the rapid traverse of a head while it is feeding, or to change the rate of feed until the feed interlocking lever is in neutral. Cross engagement of the feed and traverse levers on the pendant is prevented by mechanical interlocks. An overload clutch and feed kickout switches are provided in each feed works. There is a pressure switch in the lubricating system of the table bearing. On the hydraulic chucking mechanism, interlocks between the pilot valve and brake and clutch prevent table rotation until jaw pressure has been applied. A limit switch on the side head cross rail stops vertical movement of the side head or rail if they should be brought together. *The Bullard Co.*

Circle 56 on postcard for more data



The ram, turret and side heads each have a feed lever and traverse lever. The levers move in the direction of motion of the corresponding head. The levers operate in slots cut into a circular knob which can be rotated 45 deg. This feature provides lever control in eight directions. On the side of the pendant, a direct reading rate selector dial is provided for each head. Feed rate selection is independent of speed selection, so that feed rate changes can be made with the table in motion. Table rotation is controlled by a jog and run lever. A sensitive "stop-all" stick is provided. Power indexing of the turret also is controlled from the pendant.

Hobber Designed for Advanced Tooling



Ultra-Speed gear hobber with universal spindle head and hob driven on crossfeed.

THE model 1445 Ultra-Speed hobber is said to have major engineering changes over the predecessor model 1458, beside retaining such features as plunge cutter feed and automatic workholding tailstock.

A single-spindle hobber, the 1445, will machine both spur and helical gears at selective variable speeds ranging to 570 rpm. It will handle up to eight pitch gears having diameters as large as five in. and face widths to four in. Either climb or conventional hobbing can be utilized. The table, according to the manufacturer, illustrates typical production jobs.

This latest model is engineered to handle hob speeds of the future, when carbide or similarly performing metals become practical hob materials. Three separate adjustments incorporated into the hobbing spindle head are hob thread angle, gear helix angle, and hob position shift. Hob angles of plus or minus 15 deg, and left or right helix angles up to 45 deg can be set-up quickly on swivel-mounted sections with vernier scales for supplying accurate settings. Hob position is shifted hydraulically over a total movement of three in. Hydraulic-powered cross-feed drives the hob. *Michigan Tool Co.*

	Length	P.D.	Pitch	No. Teeth	Helix Angle	Production Time
Gear No. 1	2½ in.	1.169 in.	16	18	15°46′	2 min. 36 sec.
Gear No. 2	⅝ in.	937 in.	18	16	18°30′	60 sec.

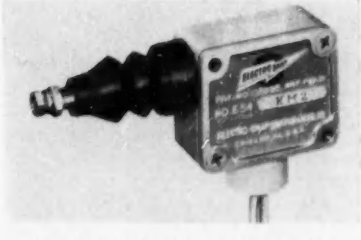
Circle 57 on postcard for more data

Impulse Switch

A ONE-WAY impulse switch now being offered sends a short electrical impulse and then is out of the circuit. It is designed for sequencing setups without the need for an additional interlock switch to open the impulse circuit, or for one-way dogs.

The various models of the ES4 series have a 0.05-in. plunger pretravel, an On period of 1/16 to ⅜ in., and overtravel of ⅜ to 1/16 in. when the circuit is opened again. It remains open on plunger return. Probable contact life at 10 amp, 250 v rating is estimated at 750,000 operations by the manufacturer. *Electro-Snap Switch and Mfg. Co.*

Circle 58 on postcard for more data



The ES4 Electro-Snap one-way switch.

NEW EQUIPMENT PLANT • PRODUCTION

For additional information, please use postage-free reply card on page 89

Unusual Press Drive

CLEAN design and greater compactness are features claimed for the one-point double action, right-to-left drive used in a series of presses now being made. This press has a 26-in. stroke and 60-in. shut height on the inner slide, yet the overall height of the press is only 21 ft. The drive is placed on the back of the crown and the blankholder linkage is now inside the uprights. Special shallow bed construction reduces the height and permits installation without a pit. Adjustments for the blankholder have likewise been kept inside the body. Linkage bearing surfaces and blankholder gibs are constantly flushed with filtered oil from the automatic circulating lubrication system. The press is equipped with an eddy current clutch providing electrical acceleration of the slide motion for stroking. (*Danly Machine Specialties, Inc.*)

Circle 59 on postcard for more data

One of the Danly presses with right-to-left drive.

Fork Truck Line

CALLED the FG line, gasoline powered industrial fork lift trucks just announced feature 130 in. lift, extremely short turning radius, and a low initial cost. Developed from designs for the armed forces, the new trucks are available in 3000, 4000, and 6000 lb capacity models.

Power is provided by Hercules heavy duty industrial engines. Transmission features an 11 in. Rockford clutch rated at twice the torque capacity of the engine. There are two speeds in both forward and reverse. The drive axle has bevel gear reduction and an automotive type differential. There is a further gear reduction in the wheels. *Baker-Raulang Co.*

Circle 60 on postcard for more data

Anti-Backlash

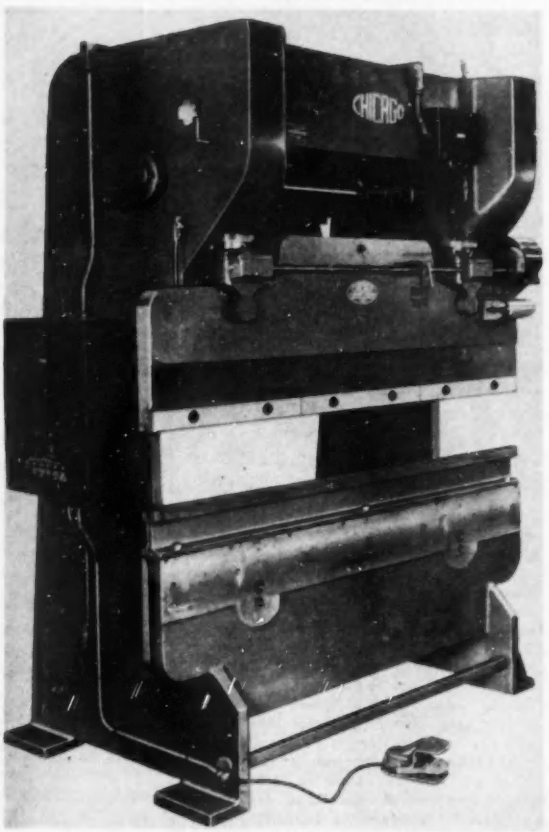
TO OVERCOME backlash in gear trains used for precision control, Min-a-lash gears have been developed. A central lamination or wafer of nylon is flanked on either side by steel. The blanks are cut and shaved by conventional methods. After cutting, the nylon portion of the gear grows slightly to increase tooth thickness enough to reduce backlash to a negligible amount, assertedly without increasing torque. The inner nylon portion is not relied on to assume any of the gear load. Said to be a typical application is that of the gear box with a 90 to 1 ratio and an output torque rating of 30 oz-in. Although 1.0 oz-in. friction torque was permitted, it is held to 0.375 oz-in. Backlash of the complete train measures 0.02 degree. *Dexter Machine Products Co.*

Circle 61 on postcard for more data

Automatic Control for Press Brakes

An electric control for press brakes consists of a foot switch which replaces the standard foot lever, solenoid for operating the clutch, automatic switch box, and a control panel. This control panel through individual switches permits setting the machine for the following operations: Inching; inching — nonrepeat; inching down — self-return — nonrepeat; inching — preset stop; inching — preset stop—nonrepeat; double clutch —preset stop — nonrepeat; one- or two-man operation. It is shown on the L series design. (Dreis & Krump Manufacturing Co.)

Circle 32 on postcard for more data



A-C Welder Line

A COMPLETE line of low maintenance, a-c welders for high speed production has been announced, consisting of NEMT rated 300, 400, and 500 amp models. The welders feature stepless current control through a moving primary coil, silicone insulation, aluminum coil windings, and are equipped with a large current scale. Fingertip current adjustment and quieter operation are made possible by a new feature in which the coil supports float in a special rubber bushing.

Wide current ranges on the new welders (38-375 on 300 amp, 52-500 on 400 amp, and 65-625 on 500 amp) enable them to be used on practically all industrial applications ranging from light-duty, low current, to heavy-duty, high current welding jobs. They are especially suited for heavy section welding where high current is desirable and when arc blow would otherwise cut welding speed and quality.

Additional features include: an automatic hot start which provides an extra surge of current for easier starting, arc stabilizing capacitors, power-factor capacitors, primary switch, and an idlematic control and louvre canopy for adaptation to outdoor applications.

Designated 6WK30L, 6WK40L, and 6WK50L, the new welders are available for 220/440 or 550 volt operation. *General Electric Co.*

Circle 63 on postcard for more data

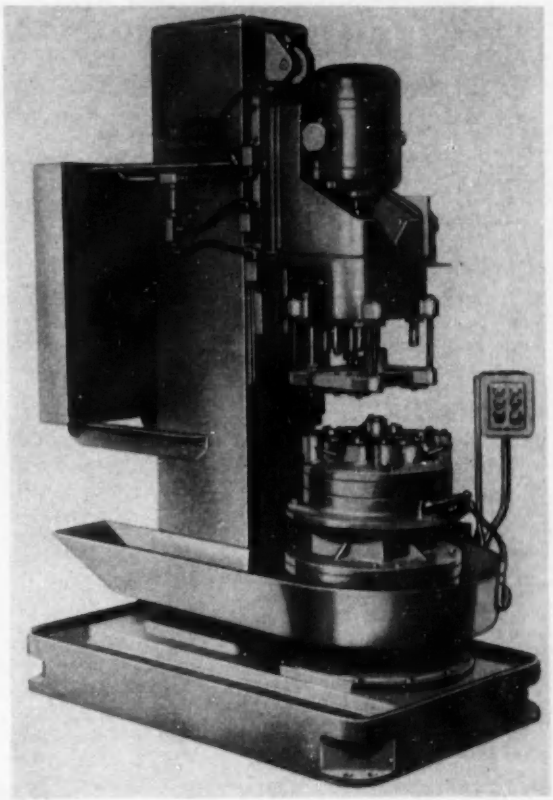
Degreaser

THE Manpro Vibra-Degreaser was announced recently. It is claimed that this unit is a high production machine in which any combination of degreasing cleaning cycles may be incorporated. The unit is equipped with a conventional type hopper. The small parts to be cleaned are loaded into the hopper. The parts are drawn from the hopper by an electro-magnetic vibratory feeder. This feeder carries the work at a constant and controlled rate through a chute and into a pan at the bottom of a spiral-elevator, which carries the work up through the cleaning cycle to the discharge point.

The elevator is attached to flexible leaf springs and is vibrated at a high speed by an electro-magnet which is energized by a pulsating current. The speed of the spiral elevator is varied by a selector switch. *Manufacturers Processing Co.*

Circle 64 on postcard for more data

Short-Run Hydraulic Feed Machine



The standard cycle of the Hydro 3 machine is rapid advance feed, positive stop, and rapid return. However, such features as second feed, jump feed and dwell can be added.

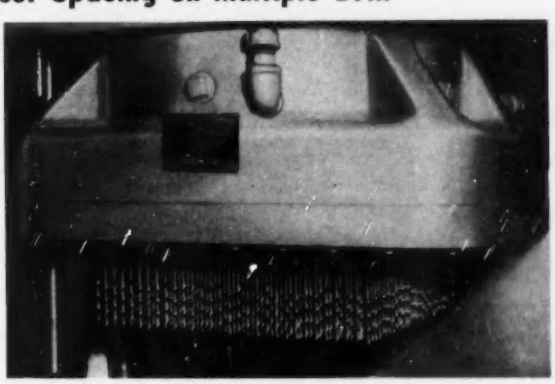
A STANDARD way-type hydraulic feed machine, the Hydro 3, is designed for short run multiple head operations. It has a cast iron base with a built-in coolant tank, chip trough and cleanout. The welded steel column has hardened and ground ways. The width of the ways is 7½ in.; the stroke is 10 in.; the feed thrust is 3100 lb; and the ways are automatically lubricated. The motor mounting brackets are capable of mounting 7½ hp, 1200 rpm motors.

Index tables are available with built-in safety features, driven by a fluid-drive motor. Three sizes—20, 30, and 42 in.—can be bored for any number of stations ranging from two to fifteen.

The hydraulic installation is Vickers throughout. It complies with the latest JIC revision with a three hp 30 gal tank unit. The electrical control panel is built to JIC standards. *Michigan Drill Head Co.*

Circle 65 on postcard for more data

Closer Spacing on Multiple Drill



Gearless drill heads now can have drill and tap spindles as close as the sum of the drill diameters. Formerly, the method allowed holes to be no closer than twice the drill diameter. Up to 960 holes have been drilled in one operation. Heads will fit standard machines. (Zagar Tool, Inc.)

Circle 66 on postcard for more data

NEW EQUIPMENT — PLANT • PRODUCTION

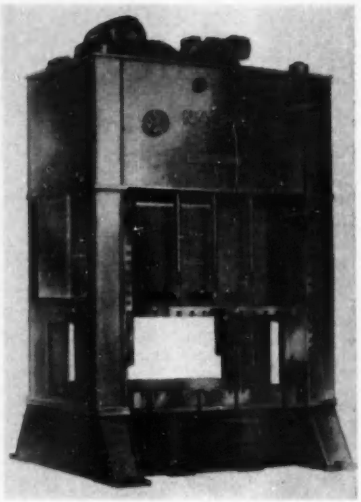
For additional information, please use postage-free reply card on page 89

Eccentric Presses

STRAIGHT side eccentric geared presses are being produced with one, two and four point suspension, covering a range of 100 through 1000-ton capacities. Series SE presses are described by the manufacturer as suitable for work requiring large die areas; heavy tonnage demands; long stroke, deep drawing jobs where work is engaged high up on the stroke and bottom-of-stroke blanking and punching.

In the crankless eccentric drive, the eccentric is an integral part of the main gear (or gears) which rotates on a stationary pin rigidly supported in the crown, close to the point at which the pressure is exerted. Serving merely as a pivot, the pin carries no torsional load and relatively little bending load.

Frames are of all-steel, four-piece tie-rod construction. The low-inertia, pneumatic friction clutch is designed so that most of the weight of the clutch continues to rotate with the flywheel. Only the drive shaft and driving plate start and stop with each cycle. *Niagara Machine & Tool Works.*



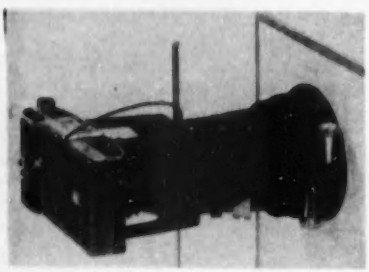
A Niagara eccentric geared press of two-point suspension.

Circle 67 on postcard for more data

Oscilloscope Camera

THE special 1:1 FPO Polaroid Oscilloscope Camera soon to be available is an adaptation of the Polaroid-Land principle. It delivers a permanent record of transients or repetitive phenomena that appear on the C-R tube, in the shortest possible time after they have occurred. This camera is designed to mount on any scope type electronic device having a five-in. tube and a bezel measuring 5⅝ in. OD. It is equipped with a 75mm f/1.9 Wollensak Oscillo-anastigmat with a No. 3 Alphax shutter having speeds of one sec to 1/100 sec, time and bulb. Print area is 3 by 4 in.

Available accessories include a Wollensak Opal filter for pre-solarization of the film; a round base bezel which can be adapted to most oscilloscopes having bezels larger than 5⅝ in. OD or those having bezels too small to be fitted by means of a gasket; and a square base bezel for use on oscilloscopes having no bezel and provided with a square filter. *Fairchild Camera and Instrument Corp.*



The Polaroid-Land oscilloscope camera for fast film processing.

Circle 68 on postcard for more data

Heavy Metal

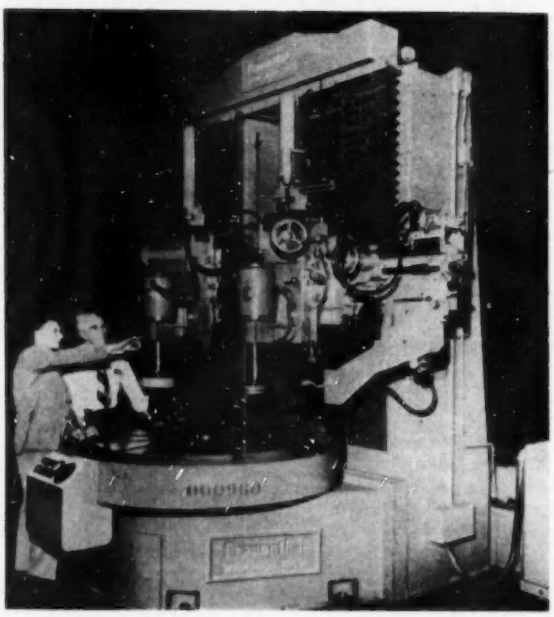
HEAVY Metal, a combination of 95 per cent titanium and the balance nickel and copper, has specific gravity range up to 18.2, modulus of elasticity 42,000,000 and tensile strength up to 120,000 psi. It can be machined like gray iron, and is finding use for counterweights, accelerometers, contacts and circuit breakers, flywheels, dies and similar parts for hot extrusion and upsetting. *Firth Sterling, Inc.*

Circle 69 on postcard for more data

Large Vertical Grinder for Hubs

A new double spindle, vertical grinder used in grinding blade retension raceways in the hubs of Turbo-Hydromatic propellers, was installed recently at Hamilton-Standard, Div. of United Aircraft Corp. Accuracies of diameters, vertical center distance and concentricity within 0.00020-in. are said to be obtainable. Hydraulically actuated contour forming wheel dressers and a turret stop device to control raceway positioning are included. Rotary table drive unit is a motor-generator set with speed control located in the main control station. (Frauenthal Div., Kaydon Engineering Corp.)

Circle 70 on postcard for more data



Knock-Down Cabinet

THREE knock-down Hallowell tool cabinets have been developed to be packaged for shipment in cartons only one-quarter the size of the assembled cabinet.

The new cabinets, which can be bolt-and-nut assembled in four simple operations with only a screw driver and wrench, are stored in comparatively small space and, protected in their carton, delivered fresh and unmarred. Prices are up to 25 per cent less than those on similar welded cabinets in the company's standard line. Finished in baked-on green enamel, they come in single-door and double-door models. The former, with two adjustable shelves, has a working top 15 by 21 in. It is 34 in. high. The two-door style has one adjustable shelf. It is 35½ in. high and comes in two top-sizes: 18¼ by 36 in. and 24 by 36 in.

Cabinets can be furnished with detachable feet or with three-inch steel-tread or rubber-tread swivel casters. The full-width top has two-inch sides and back to prevent tools from sliding off. There is a chrome-plated locking handle for the doors. *Standard Pressed Steel Co.*

Circle 71 on postcard for more data

Power Insert Driver

A POWER inserting tool for large-scale installation of wire thread inserts is designed to drive inserts to provide internal threads in sizes ranging from No. 6 to ¼ in., National Coarse and Fine. The same basic tool is used for all inserts in this size range, with only a few quick changes required in the tip or driving end for each size.

The inserting tool can be powered either by air or electricity. It can be used as a portable tool or held in a drill press or universal tool holder. *Heli-Coil Corp.*

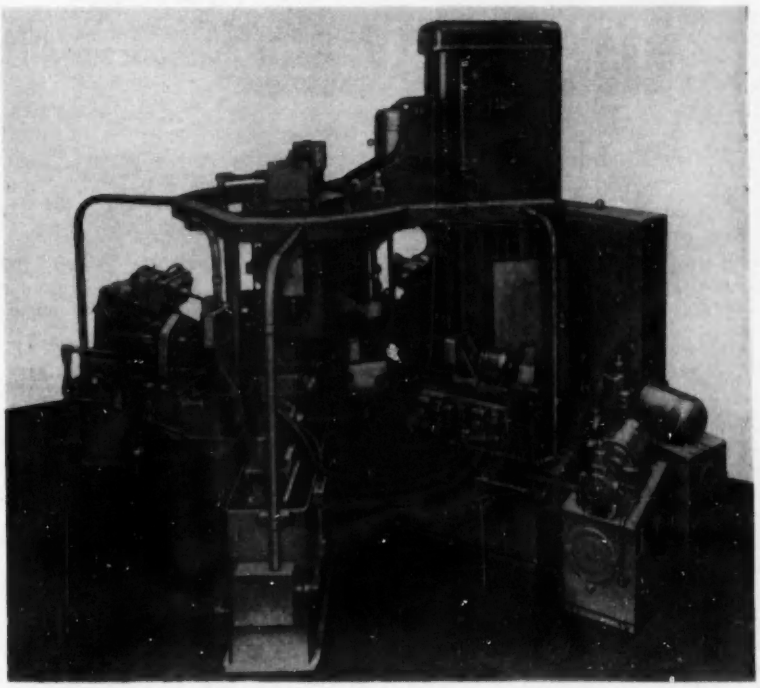
Circle 72 on postcard for more data

Sprag Clutch

THE Series 50 backstop clutch offers all the features of the maker's design, including full sprag complement, to the customer who can supply his own inner races. The outer diameter of the clutch is basically the same as the outer diameter of a standard bearing. Diameter tolerance is held to insure proper fit (without pressing) into a continuation of the adjacent bearing bore. *Formsprag Co.*

Circle 73 on postcard for more data

Eight Station Special for Transmission Cases



Automatic index on this Buhr Special is electrically controlled, and of the cam-and-roller type which produces uniform acceleration and deceleration of indexing movement.

HERE is an eight-way six-station center-column hydraulic-feed multiple-spindle Special. It features a three-spindle power wrench with individual torque control to actuate fixture clamping-mechanism, as well as a movable bushing plate. The 72-in. automatic index table is equipped with shot bolt, with a detachable indexing mechanism.

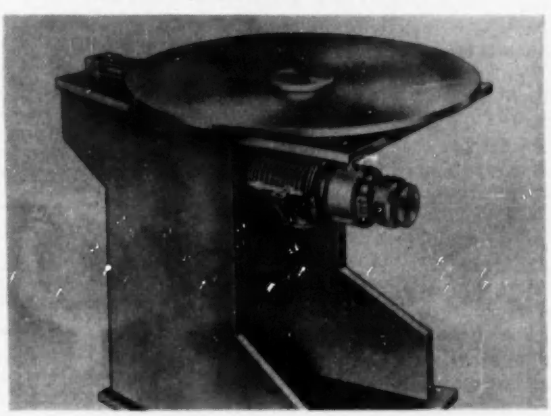
Besides drilling, reaming and counterboring on transmission cases this machine also performs a face-milling operation with a specially-designed generating tool. Production rate is 90 pieces per hour at 100 per cent efficiency. Standard features include interchangeability of parts that are all held to tolerances; location of all component assemblies by precision-bored dowels; hardened-and-ground laminated tool-steel ways; automatic lubrication; multiple heads of ball-bearing construction with shaved gears and broached-and-splined drives. Hydraulic and electrical installations meet JIC standards. *Buhr Machine Tool Co.*

Circle 74 on postcard for more data

Index Table with Adjustable Functions

Rotary indexing for welding, machining, and assembling is fully adjustable for station location and time of index. A gearmotor and magnetic brake are controlled by limit switches at each station. Wedge block pneumatically driven gives positive location by engaging cam roller at the station. (Sciaky Bros., Inc.)

Circle 75 on postcard for more data



NEW EQUIPMENT — PLANT • PRODUCTION

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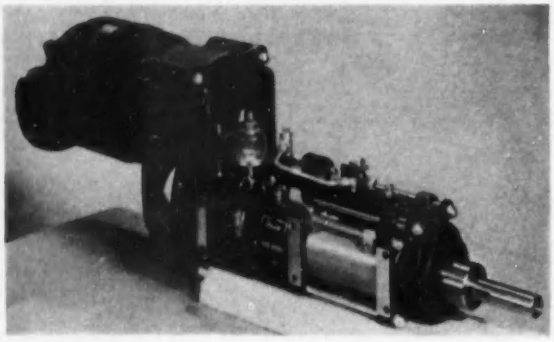
Self-Contained Drill Unit Added

MODEL 34 Holomatic (air-hydraulic) drill unit has a self-contained electric motor-pulley drive system designed to use either timing belt or V-belt drives for power transmission from the motor to the spindle. Speeds from 300 to 10,000 rpm can be established by the interchange of pulleys and motors. Electric motors of ½, ¾, 1, 1½, and 2 hp are available.



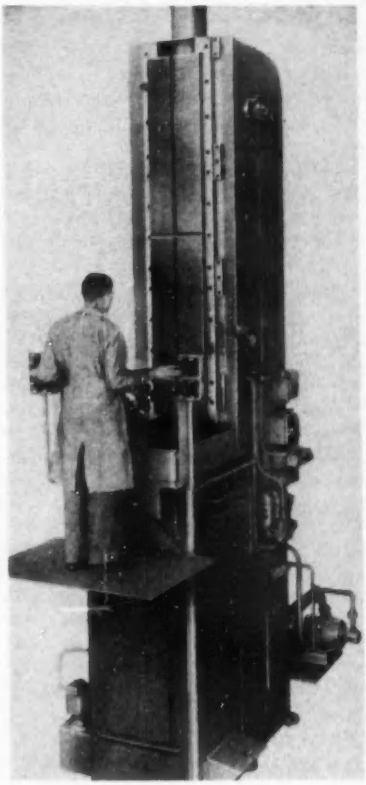
Automatic, semi-automatic or manual cycling, skip drilling, back-feeding, manual jogging and positive stop with dwell operations are said to be easily achieved with the Holomatic self-contained Model 34.

Work loads of up to 200 lb-in. of torque can be handled. Drilling, reaming, spot-facing, chamfering, tapping, threading and hollow-milling can be accomplished.

A newly-developed automatic hydraulic oil filling system has been incorporated to maintain the oil level in the hydraulic section. Advance and retract thrusts are developed by air pressure with single or multiple feed rates and rapid travel movements established by adjustable hydraulic controls. The built-in four-way air control valve can be actuated by the built-in control poppets or by remote air or electric operated valves.

Operating on air supply pressures of 50 to 150 psi, the developed thrust equals 8½ times the input air line pressure. Depth accuracies to 0.0005 in. can be maintained by use of positive stop and dwell. *Hause Engineering.*

Circle 76 on postcard for more data



Vertical Broach

A vertical hydraulic surface broaching machine (SB-90-15), with 90 in. stroke and 15-ton work capacity was developed to meet requirements in machining jet engine alloys. It can be supplied as a single or dual ram unit. Specifications for the single ram unit illustrated, are: Variable broaching speed—5 to 30 fpm; return speed—60 fpm; work height—9 ft; overall height—19 ft. (American Broach & Machine Co.)

Circle 77 on postcard for more data

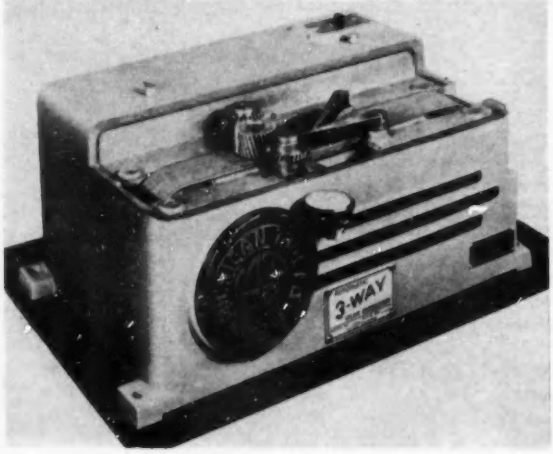
Resin Spray Gun

DESIGNED to simultaneously spray plastic resin and catalyst, a spray gun now on the market is claimed to assure a uniform mixture. Resin is fed to the gun through the fluid line and the catalyst is introduced through the air stream. The gun has but one head. When the gun trigger is actuated, catalyst and resin meet outside of the air cap and are atomized uniformly so the correct amount is applied to the surface being sprayed.

The gun is provided with a single pressure control for the resin and a double pressure control for the catalyst which is the governing agent in setting the resin. *DeVilbiss Co.*

Circle 78 on postcard for more data

Classifies Gears Three Ways



A conveyor-type, three-way gear classifier separates wide-face and cluster gears into acceptable, salvageable, and non-salvageable categories based on one or a combination of the following factors: undersize, oversize, correct size, eccentricity, and plus or minus helix angle. (Michigan Tool Co.).

Circle 79 on postcard for more data

Coating Line Extended

The Fosbond line now includes all chemicals necessary to apply iron or zinc phosphate coatings to steel or zinc surfaces for improved paint adhesion. An important component is Actidip, which in alkaline cleaners eliminates emulsion cleaning to refine the crystal size of zinc phosphate coatings.

Recent additions to the Fosbond line include Fosbond 10, 40, 60, and 61 compounds for phosphating of zinc and the application of heavy zinc coatings to steel. For cleaning and phosphate coating in one operation Fosbond 20 and 22 compounds are available.

Improved phosphatizing and lubricating compounds have also been added to the Fos Process line. This process is widely used in cold extrusion of metals and in wire and tube drawing as a lubricating system to prevent galling and to reduce tool and die costs. *Pennsylvania Salt Mfg. Co.*

Circle 80 on postcard for more data

Aluminum Welding Electrode

Welding electrode to provide maximum weld quality in the inert-gas, shielded arc welding of aluminum has been developed. It is expected to meet Navy Specification MIL-E-16053-B Ships 21 May 1953, for inert gas welding of aluminum. Each lot of the product, called Alcoa I. G. (Inert Gas) Welding Electrode, is tested by welding in the overhead position.

The electrode was designed to be used in the welding guns employed with existing consumable electrode, shielded arc processes. These processes include: Air Reduction Sales Co.'s Aircomatic process; General Electric Co.'s Fillerarc process; and Linde Air Products Co.'s Sigma process. It can also be used for tungsten-arc welding where the filler wire is fed mechanically to the work. The electrode is currently being produced from 2S, 43S and A54S alloys. *Aluminum Company of America.*

Circle 81 on postcard for more data

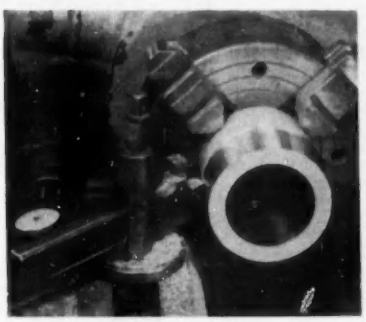
Nickel Brightener

Improved corrosion resistance of 30 per cent for minimum deposits of nickel, and up to 100 per cent for thicker deposits, is announced as result of tests with a new formula of Nickelite brightener. Elimination of brittleness of nickel finishes, and an accompanying attainment of maximum brilliance of the surface, also is claimed for barrel nickel plated steel parts. The product is now packaged in quadruple-strength concentrate in quart bottles, to eliminate the necessity to ship and handle carboys or other large containers. *Platers Research Corp.*

Circle 82 on postcard for more data

Tool Shank Alloy

Boring bars and lathe tool shanks of a new metal alloy which is said to reduce tool chatter have been introduced. No-Chat boring bars and



tool shanks are reported to permit deeper cuts and result in smoother surfaces which often require no finish grinding. A hogging cut on a tungsten alloy part is shown. *Metals & Ceramics Div., P. R. Mallory & Co.*

Circle 83 on postcard for more data

Neoprene Adhesive

Development of an industrial adhesive to be known as Neoprene Adhesive F-1 is announced. No accelerators, catalysts or two part mixing is required. It is said to spread readily and be easily applied by means of a spatula, brush or spray equipment.

F1 is said to adhere to almost any type of surface with excellent adhesive to metals. Only good contact pressure is necessary to insure a strong bond. In most cases the application of external pressure prior to setting, is unnecessary after the surfaces have been joined.

Because of its "grab" most assemblies made with F-1 can be subjected to normal handling immediately after the bond has been effected, according to the maker. Although F-1 is not a vulcanizing type adhesive, a cure does occur on aging, even at room temperature. A peel strength of 40 psi between two sheets of Neoprene is developed within 7-10 days. Canvas to cold rolled, shiny steel bonds have been measured in excess of 25 lb peel strength per lineal inch of width. *Adhesive Dept., Carboline Co.*

Circle 84 on postcard for more data

Magnesium Sealer

Magseal is a resin combination which impregnates magnesium in much the same manner as conventional impregnation, yet which is said to give greater corrosion protection in areas where dissimiliar metals contact the magnesium.

In the process, after the metal is removed from the autoclave all parts are rinsed in an alkaline type cleaning solution. Polymerization is done in a pressure bake oven at 275 F, under 100 psi. This heat under pressure does not allow the impregnant to weep, keeping all the resin under the metal surface. Upon removal from the oven all parts are placed in another alkaline type "stripper" solution that removes any remaining impregnant from all surfaces including tapped holes. The resin is formulated for complete penetration into the smallest of porosities and yet has sufficient body to seal the large or spongy porosities prevalent in magnesium castings. *Nu-Line Plastic Impregnating Co.*

Circle 85 on postcard for more data

Hot Pressed Tungsten Carbide

Smoother surfaces and closer tolerances are now obtainable in a line of hot pressed tungsten carbide products called Sinterforge SF (Superfinish).

Smooth, dimensionally controlled surfaces are said to be produced on the sections of the article that require close tolerances in the finished product. Typical examples of parts produced advantageously by this new method are drawing dies, bushings, mandrel tips, and core rods for powder metallurgy. The line includes all grades of tungsten carbide that are conventionally used in hot pressed products. This includes the range of cobalt contents from six to about twenty per cent. The process is particularly applicable to the high cobalt (binder rich) compositions, where there is a reduction in surfaces roughened by "sweating out" of the binder. *Sintercast Corp. of America.*

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NEW PRODUCTS

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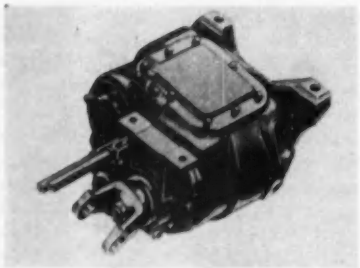

Two Auxiliary Transmissions Added

The first of two auxiliary transmissions now offered is a two-speed model that supplies greater pulling power without gear splits. This model provides an underdrive ratio of 2.18 to 1, for trucks with gas engine displacement of up to 265 cu in. The other transmission (shown) is a three-speed model for extra power with gear splits. Optional ratio combinations are available as is a built-in, full engine torque, variable speed power take-off. It has constant mesh helical-cut gears and lightweight clutch blocks. It is built for duty with gas engines of up to 400 cu in. displacement. *Truckstell Manufacturing Co.*

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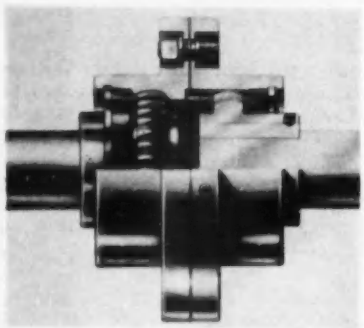

Coupling Teeth Maintain Line Contact

The Sphereflex coupling features gear teeth which are cut on a segment of a sphere. This coupling, which has been used in aircraft and other specialized fields, now is said to be competitive in price with regular couplings.

The male teeth of each coupling half are cut on a true spherical arc while the internal teeth are cut with a straight root. Thus, whenever misalignment occurs, the curved tooth maintains a constant area of contact with the internal tooth. Teeth are of uniform thickness from side to side. No thrust load on bearings can develop through the coupling, according to the maker. The standard coupling is suitable for angular misalignments up to plus or minus 3½ deg on each coupling half. Special couplings are available, suitable for 14 deg misalignment. Floating shaft and vertical couplings also are available. *Philadelphia Gear Works.*

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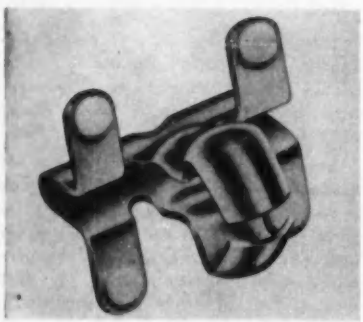

Low Cost Quarter-Turn Fastener

A one-piece quick fastener that resists severe and prolonged vibration has been introduced. Named the Q-4, it is said to cost only a fifth as much as other quick-operating fasteners. It is a blind fastener (applied from one side only) well adapted to take-up in commercial sheet metal tolerances. Once snapped in place, the Q-4 is self containing in the outer sheet or panel. A typical application showing these advantages is the use of the Q-4 to hold an engine splash pan to an automobile frame.

Cost savings with the Q-4 have also been made on a material basis alone. Sizes are available to accommodate various panel thicknesses. Samples and complete engineering data are available from *Shakeproof, Div. of Illinois Tool Works.*

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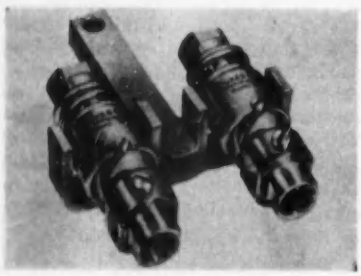

Couplers for Pull Behind

The availability of a positive breakaway coupler that is claimed to couple with full pressure on both sides of the line has been announced. The use of nylon valve seats is said to insure positive self-sealing on break-away. The coupler can be mounted individually or in tandem. *Dukes Co., Inc.*

Circle 39 on postcard for more data

Engine Turn Pattern

The 1-ET Rigid-Tex Metal engine turn pattern produces moving highlights when viewed from any angle. This light pattern has a maximum pattern depth of 0.025 in. that is claimed to resist marring, hide scratches and fingerprints and reduce glare. *Rigidized Metals Corp.*

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FREE LITERATURE

Cylinder Program 1

"A Cylinder Program for Automation," a 12-page pamphlet highlights standardization of mounting dimensions and stroke lengths, interchangeable detachable mountings, and other features of air and hydraulic cylinders. *Miller Fluid Power Co.*

Control Valves 2

Dimensional data and features of hydraulic directional valves for mobile equipment applications—covering one, two, three and four-spool models of from eight to 35 gpm capacity—are provided in 10-page catalog file 1551A, available from *Industrial Hydraulics Div., Parker Appliance Co.*

Cast Stainless Alloys 3

Data sheets covering the properties of many alloys used for corrosion resistant castings, bound in a file folder, are available from the *Alloy Casting Institute.*

Vacuum Metallizing 4

Vacuum metallizing—the depositing of a thin coating of metal by evaporation and condensation under high vacuum conditions—is described, and many of its applications are illustrated in "Vacuum Metallizing," just issued by *F. J. Stokes Machine Co.*

Plywood Containers 5

A case history booklet on plywood shipping containers takes the reader through the manufacturing processes, laboratory facilities, and includes before and after photographs which show how tough shipping problems have been solved. *Atlas Plywood Corp.*

Turret Tools 6

The seventh edition of its Turret Lathe Tool Catalog—a 197-page book containing illustrated listings of standard tools, chucks, collets, and miscellaneous equipment—has just been released by *Warner & Swasey Co.*

Air Data 7

An engineering folio describing air data components and systems for aircraft and guided missiles includes information on transducers, computers and completely integrated air data systems for measuring all aerodynamic conditions affecting flight. *AiResearch Manufacturing Co.*

Investment Casting 8

A 20-page booklet being distributed gives a simple explanation of the lost wax process and comparisons with other processes. *Scott Casting & Mfg. Co.*

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Filtration Savings 9

Dollar savings in using Delpark coolant filters at Continental Motors Corp. are tabulated and explained in a brochure just released by *Industrial Filtration Co.*

Engine Controls 10

Automatic controls for engine protection and industrial applications, including solenoid valves, contact makers, pressure and temperature controls, and other types are described in catalog No. 100-D. *Detroit Controls Corp.*

Surface Treating 11

Twenty-four chemical products and processes for treating metal surfaces, including alkali cleaners, phosphate coatings, rust removers, deoxidizers, emulsion cleaners, and painting compounds, are outlined in a folder by *Metasurf Corp.*

Quality Control 12

A folder "SQC Quality Control Data" shows charts, graphs and examples of how quality control is applied in the manufacture of small metal parts. Tests of raw materials and manufacturing operations are discussed. Photos and drawings illustrate the various laboratory tests involved. *George K. Garrett Co.*

Welders 13

Details of standard air operated press type, low impedance single phase, FP1 projection and SP1 spot welders are available in a six-page folder. They are part of a series of single phase spot and projection welders available in 30, 50, and 75 kva at 50 per cent duty cycle. Bulletin 324-2. *Sciaky Bros., Inc.*

USE THIS POSTCARD

Motor Catalog 14

A multi-color booklet, No. 1878, illustrating 20 principal types of electric motors has just come off the press. *U. S. Electrical Motors, Inc.*

Cost Comparing Chart 15

Cost of using cold drawn seamless steel tubing, as against using cold drawn steel bar stock, to manufacture a part with a longitudinal hole in it, is shown in chart form. Dollars per foot material cost of bar stock and various outside diameters and wall thicknesses of tubing are shown for C-1117, C-1118, and in the following leaded types: 1010, 1015, 1020, and 1025. *Michigan Seamless Tube Co.*

Grinder Coolant Filter 16

Delpark filters for use with Landis precision grinders are depicted in a four-page bulletin just released. *Industrial Filtration Co.*

Pumps 17

Circulating and coolant pumps are described for easy selection in Form 7074-D, 20 pages. It shows the entire line of Class KRV & KRVS Motorpumps as set up with totally enclosed motors. *Ingersoll-Rand Co.*

Cold Formed Shapes 18

A so-called Idea Folder now offered illustrates applications for cold formed metal shapes and tubing in the automotive, materials handling equipment and farm implement manufacturing fields. *Van Huffel Tube Corp.*

Heat Exchangers 19

A description of stock and specially engineered Type F fixed tube bundle heat exchangers is given in the newly revised catalog No. 1254, 12 pages. It also contains application photographs, materials and construction features, dimension drawings and tables. *Young Radiator Co.*

Bearing Lube Theory 20

Industrial bearing lubrication theory is the subject of Vol. 40, No. 10 of the booklet "Lubrication." *The Texas Co.*

Computer Service

Facilities and staff available at the Computation Laboratory are outlined in "Into the Future—Today," a 16-page booklet. Problems in inventory control, engineering, and distribution are discussed briefly. Write on letterhead to *Computation Laboratory, Wayne University, Detroit 1, Mich.*

(*Turn to page* 179, *please*)

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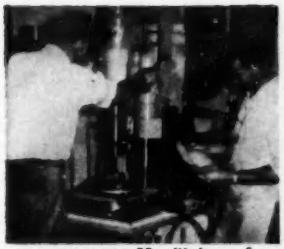

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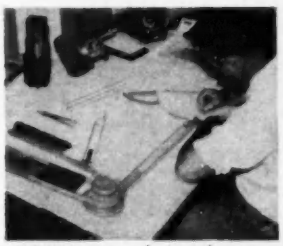

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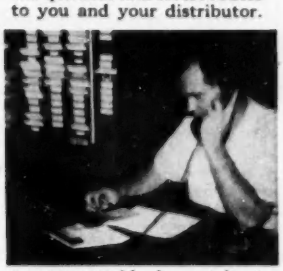

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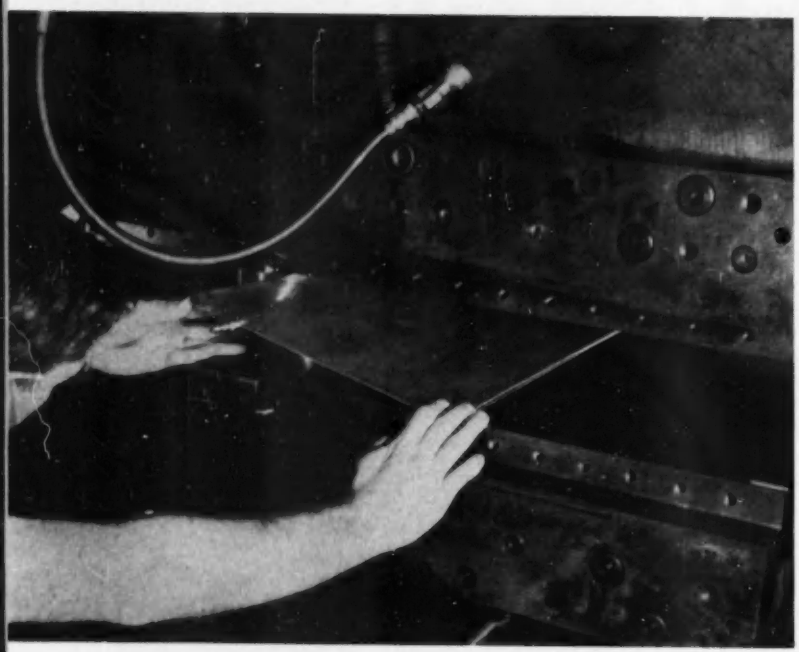
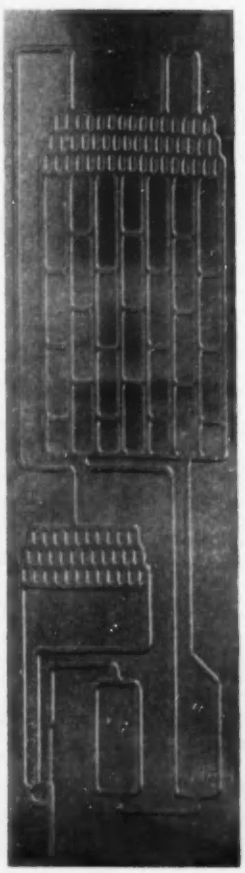
New Process for Forming Passages in Sheet Metal Parts

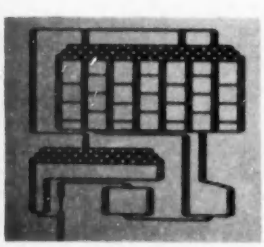


A needle has been inserted in the plate at the lead-in of the stop-weld pattern. Pressure will be applied through the needle to dilate the sheet to the height of a shim placed between the platens.



At far left is shown an experimental finned radiator section made from four pieces bonded together.

At immediate left is shown a finished evaporator plate before bending; and below is one-half of the sandwich from which it is made. Stop-weld pattern has been applied to the sheet below.



DETAILS of a process to create any pattern of passageways within a homogeneous sheet of metal have just been disclosed by the Metals Div., Olin Mathieson Chemical Corp.

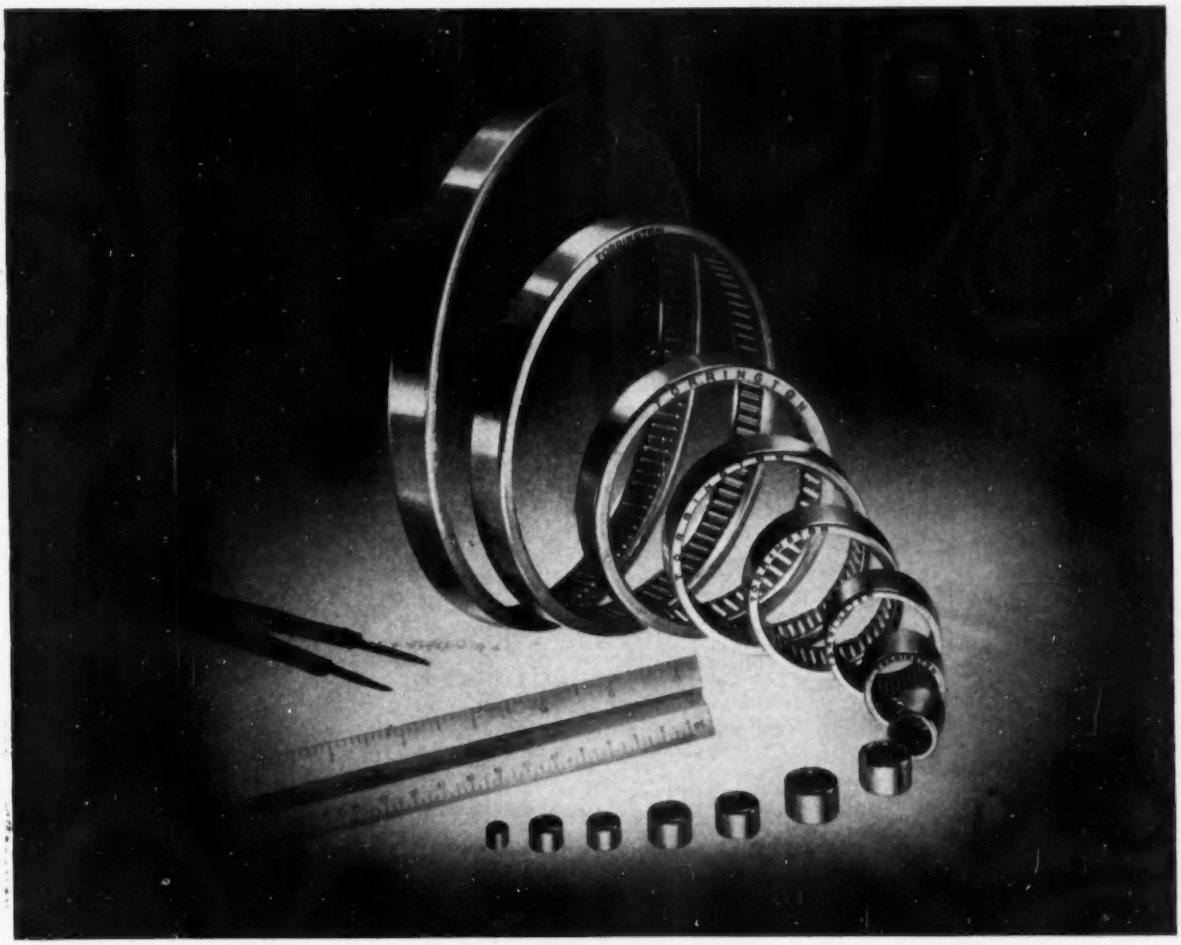
The process is a new application of roll bonding. Initially, it is being used to make evaporator plates for the refrigeration industry. The technique has been tested with success using brass, zinc, mild steel, and alloy steel. Future applications include automotive radiators and air conditioning components. Others mentioned are aircraft structural members which require cooling at high speeds.

The finished product is made from two or more sheets of metal cut to size and cleaned. The pattern that will become tubing is applied to one of the sheets by the silk screen printing process. The paint used is a so-called stop-weld material that prevents a surface painted with it from being bonded to another metal sheet. The sheets are assembled in a metal sandwich and tack welded.

This unit is heated and rolled in several passes. The first hot rolling produces the bond, while succeeding passes reduce the homogeneous sheet to proper thickness by lengthening it about four times. This is the finished size. The sheet is annealed and trimmed to bare the lead-in end of the stop-weld pattern.

A hollow needle is inserted

(*Turn to page* 160, *please*)



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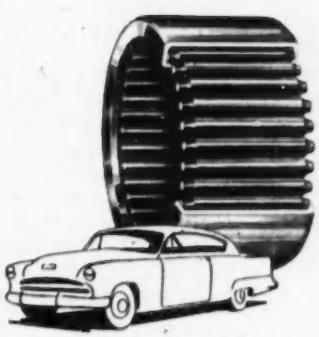


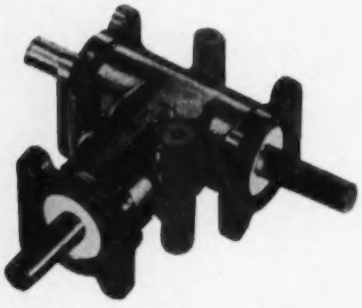
America's leading automobile makers use millions of Torrington Needle Bearings a year in steering gears, transmissions, universal joints and many other assemblies. Needle Bearings install easily, give long service life, help contribute to safer handling, smoother riding and braking to cars and trucks.

NEW AIRCRAFT PRODUCTS

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 89

Heavy Gear Unit

Up to 2½ hp can be transmitted by a heavier right angle bevel gear unit just introduced. The addition to



the ANGLgear line is available in either two-way (Model R-340) or three-way (Model R-350) transmission styles. All units are said to be strong enough for use in either power transmission or for manually operated assemblies. Coniflex bevel gear teeth utilizing the principle of localized bearing and maintenance of broad contact are used. They are ball bearing sealed units and are lubricated for life. Flanged end-mounting and three-bolt side mounting allow the units to be installed in practically any position.

They are one-to-one ratio units with rated speed of 1200 rpm. Maximum static torque capacity for this model is 2500 in.-lb.

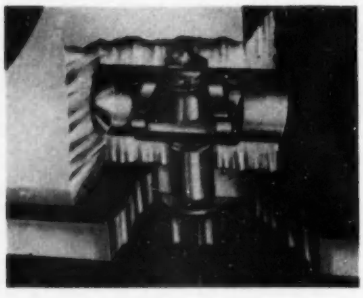
Overall dimensions are 12 by 11¼ by 4 in., including the one-in. diameter shafts. Standard shaft length for this model is 2¾ in. from housing. *Airborne Accessories Corp.*

Circle 46 on postcard for more data

Barrel Nut

For joining forgings and other structural members without a large access opening for wrenching, a self-locking high tensile barrel nut with floating action has been developed. The nut can be inserted in a simple production-drilled hole. Type 2552 stop nut is designed to withstand up to 180,000 psi at the pitch diameter of the bolt.

The two-piece fastener has an aluminum alloy base to locate the nut body. The body is held in the base by a Rollpin. The assembly is designed to move freely in the direction of the hole drilled for the nut. The nut body can move perpendicular to the axis of the hole a total of 0.030 in. in either direction, to compensate for misalignment in machining the bolt hole, small permanent deflections resulting from flight conditions, for



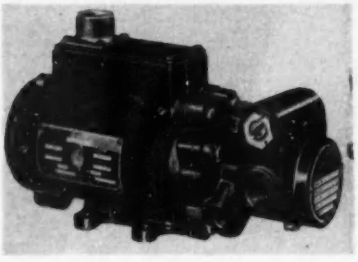
quicker initial assembly and reassembly during maintenance. During assembly a nut retaining clip which is self-retaining on the nut base provides a spring tension in the hole that prevents the nut from moving out of position.

The nut is now available in eight thread sizes from ¼-28 through ¾-16. *Elastic Stop Nut Corp. of America.*

Circle 47 on postcard for more data

12-Volt Fuel Pump

Model RG-10340 fuel pump may be utilized as the main source of fuel supply and operate continuously, or operate as an auxiliary to the engine driven pumps. The motor is explosion proof and has a fuel seal on the drive end in addition to the usual pump seal. Motor rating is 0.06 hp at 3750 rpm with 13.5-v d-c at 7.5 amp. Designed for continuous duty, the motor is fan cooled and has built in radio noise filter. The positive displacement pump is rotary type with four sliding blades. A developed bore



provides non-pulsating flow and long life. The pump is self-priming with strong suction lift.

The relief valve adjustable range is eight to 25 psi at 10 gph, or seven to 22 psi at 35 gph. Excess fuel pumped by-passes internally through the relief valve. Displacement is 0.086 cu in. per revolution. A separate by-pass valve is included to accommodate internal flow from inlet to outlet port with the pump stopped. *Lear, Inc., Lear-Romec Div.*

Circle 48 on postcard for more data

Small Clutch

A miniature clutch particularly for use in instrumentation work, the Micro-Clutch is available as a clutch

and a clutch-brake. Torque rating is eight oz-in. with a control current of 65 milliamperes. Diameter is 63/64 in. and overall length is 2⅛ in. *Magtrol, Inc.*

Circle 49 on postcard for more data

Thousands of America's best mechanics agree...

Sealed Power Chrome Rings

top the field in performance!

For original equipment... for replacement...

There's nothing finer than Sealed Power chrome-faced top compression rings, included in every Sealed Power KromeX Ring Set.

For best oil control, even in badly tapered and out-of-round bores, there's nothing finer than the Sealed Power M-50 Steel Oil Ring with chrome-faced side rails, included in every Sealed Power KromeX Ring Set.

28 leading engine builders use Sealed Power Chrome Rings.

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The BUSINESS PULSE

Model Changeover in Automobile Industry Is Big Factor in Business Recovery. Consumer Spending During Third Quarter of This Year Sets New Record. Gross National Product Continues at $356 Billion Rate.

This Survey Is Prepared Exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Company of New York.

Unemployment at Lowest Level

The pace of business has unquestionably quickened since Labor Day. The most outstanding occurrence has been the rise in steel production, but a number of smaller industries also have shown output gains.

The labor market has reflected this business improvement. According to Census Bureau estimates, unemployment had fallen to 2.7 million by the early part of October, the lowest level of the year, and Secretary of Labor Mitchell has stated that the downtrend appears to have continued since that time. The October decline (358,000), added to the attrition of preceding months, carried the jobless total about a million below the peak for the year, recorded in March.

Despite this better performance, it seems doubtful that the rise in general business volume through October was more than seasonal. The gain during September—when the Federal Reserve index of industrial production showed only its normal rise and when the Guaranty Trust Company's index of business activity actually reflected a small setback—was certainly no greater than seasonal. Nor does improvement during October appear to have been of a spectacular order.

None the less, there seems a very good likelihood that a business upturn of more than seasonal proportions will emerge before the end of the year. In September and October business recovery was handicapped by the fact that the crucially important automobile industry was in the throes of model changeovers. In November and December, by contrast, automobile output will undergo a huge rise, if present plans are executed.

Strong Impetus by Automobile Industry

Company schedules call for the output of 550,000 passenger cars in December alone, which would be a high for the year and almost double the September volume. Such a level of performance should give the entire economy a very sharp nudge. On top of the improvement which has already occurred in other industries, it ought to mean a more-than-seasonal rise in business by the year's end. However, there will be relatively little satisfaction in a rising trend of business in the months immediately ahead unless the pattern of such basic measures as plant and equipment investment and general consumer spending is favorable.

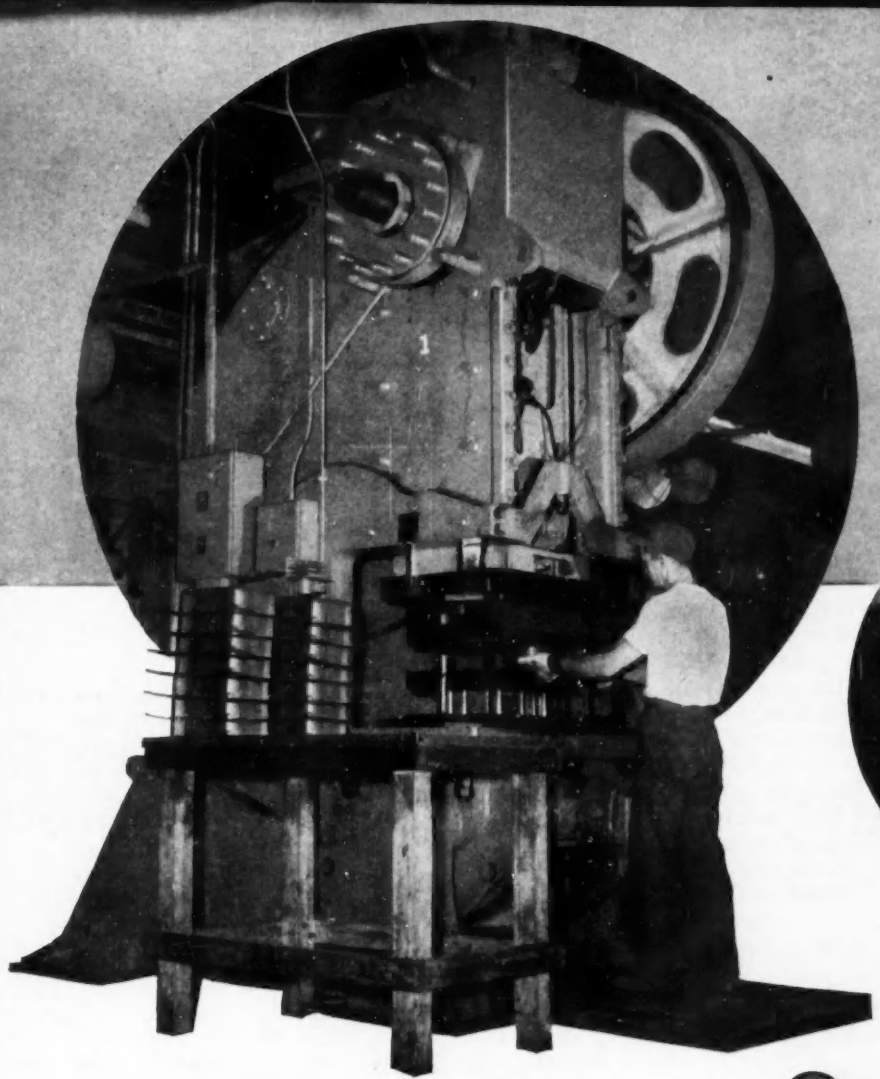
Retail Sales Higher

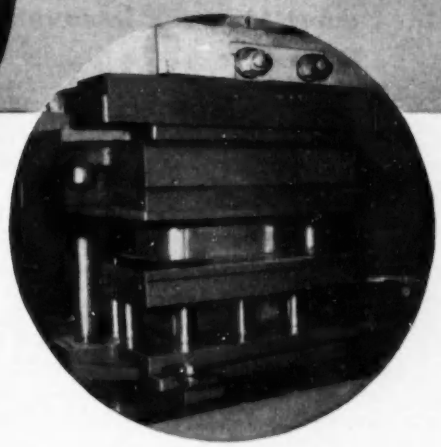
So far this autumn, consumer spending totals have been mildly disappointing. Retail sales rose in September, but the gain in volume, as in the case of industrial production, was no more than seasonal. This seems to suggest a tapering off of the uptrend in consumer spending that began in the second quarter. It is entirely possible, however, that the leveling out was due to the special conditions that have recently prevailed in automotive markets rather than to any general change in consumer sentiment. There does not appear to have been a resumption of the sales uptrend during October, to judge from preliminary and incomplete data. This fact may also be of limited significance, however, since automobile markets were still experiencing the impact of model changeovers and since weather was unseasonably warm and rainy in many regions of the country early in the month. To judge by merchant sentiment, there is no great cause for concern over September-October experience. By and large, retailers still seem confident of good and improving volume over the rest of the year.

Consumer Spending Sets Record

Total consumer spending during the third quarter of the year, according to preliminary estimates made by the Council of Economic Advisers, rose to a seasonally adjusted annual rate of $234 billion. This set a new record and was about $900 million above the second-quarter rate. Durable-goods outlay receded slightly, but expenditures for both nondurables and services rose.

(*Turn to page 222, please*)





Closeup of the die area shows shell after drawing on a 150 ton Clearing inclinable.

DEEP DRAWS ON AN O.B.I.?

DayBrite Lighting, Inc. in St. Louis, Missouri, found the right solution to drawing EXIT sign shells with this 150 ton Clearing inclinable press. The press is equipped with a die cushion providing blankholding pressure for the draw and stripping pressure to remove the shell. Like all Clearing inclinable presses, the slide permits the use of dies which are larger than the slide area itself.

A press like this 150 ton Clearing will give you the capacity to do a truly remarkable range of jobs. Standard blanking and forming operations, of course, can be performed as well as the drawing operation in this same press.

If you want extra capacity in your shop for a wide variety of press operations, call on a Clearing engineer to find the most productive answer to your problem.

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AIR BRIEFS

By ROBERT McLARREN

Comet Mystery Unraveled

The Board of Inquiry into the two DeHavilland Comet jet airliner crashes early this year has finally produced its findings—the craft were the victims of metal fatigue. Apparently, the fatigue appeared in the fuselage skin next to a window frame, producing a small crack which increased rapidly until the high-pressure interior of the airplanes at altitude exploded. The victims seemingly died of explosive decompression at altitude, many of them catapulted from the great tear in the fuselage. The Board charged flatly that the difficulty lay with faulty design and manufacturing methods. It was probably only coincidence that DeHavilland had to suffer the misfortune of the accidents, for it was the first to fly full passenger loads in pressurized cabins at high altitude and high speed. Metal fatigue is still a baffling engineering problem, but the ill-fated Comets have provided invaluable design lessons for the future.

Supersonic Orders

The Air Force has ordered two new supersonic combat aircraft into production—the Convair B-58 and the Lockheed F-104. Cloaked in mystery, the F-104 has been undergoing secret test flights at the Air Force Flight Test Center in California since last February. First of the "lightweight" era in USAF fighter design, the tiny craft features straight wings. It is powered by a Wright J65 turbojet engine with afterburner. The giant Convair B-58 hasn't been built yet, but it is known to be a delta-wing bomber powered by four jet engines in pods. About $100 million has been allocated for the two aircraft for initial production quantities. The Air Force has also ordered $100 million worth of additional North American F-100 Super Sabre supersonic jet fighters; this group is to be built in the company's Columbus, O., facilities.

1000 Stratojets

Boeing Airplane Co. has announced delivery of the thousandth B-47 Stratojet six-jet swept-wing bomber, now the backbone of the USAF's medium bomber force. First of the postwar era of swept-wing bombers, the huge B-47 has spanned both oceans, flown to the North Pole, and smashed records of every description. Now in production also by both Douglas (Oklahoma City) and Lockheed (Marietta, Ga.), the fast bomber reportedly will be continued in production past the two thousand mark—one of the longest production runs for a bomber in aviation history, and by far the longest in peacetime.

Tough Problem Solved

Britain's new Fairey Delta 2 research airplane has solved one of the pressing problems peculiar to its type. The delta-wing configuration must pitch up to a very high angle of attack in order to develop its maximum lift, either in takeoff and landing. In the latter case, a difficult problem is posed for the pilot in seeing forward. Fairey has solved this problem by a "droop snoot," in which the entire forward fuselage, housing the pilot and all his controls, can be cranked down for improved vision. Once in flight, the nose is cranked back up into its normal position.

Stratosphere Target

The Navy and Air Force have long faced the problem of giving their surface-to-air (anti-aircraft) guided missile something to shoot at, and they have finally come up with the answer—another missile. Present target aircraft do not have the power to climb to altitudes of 40,000 ft or more, and the only craft capable of attaining such altitudes are far too expensive to use as targets. Navy technicians at White Sands Proving Ground, New Mexico, working with the New Mexico College of Agriculture and Mechanic Arts, have developed a 13.5-ft rocket which is fired, upon signal, out into the desert. As it passes the prescribed altitude the nose is blown off, and a 20-ft parachute emerges. The parachute is coated with a silver compound which provides excellent radar reflection. Guided missiles are then launched to seek out and destroy the parachute floating at high altitude. Although the target does not give simulation of the high speed to be expected of an enemy bomber, it is said to be the first inexpensive method yet developed to test guided missiles at high altitudes.

Nuclear Aircraft

The Air Force plans to build a $30 million laboratory at East Hartford, Conn., in conjunction with its

(*Turn to page* 218, *please*)

WARNING

of any abnormal engine condition

Synchro-Start SAFETY ALARM SETS automatically warn with visual and audible signals as soon as such conditions as low oil pressure, low air pressure and overheating, etc. occur.

Three switches are provided — control "on-off" — test — audible alarm cut-off. For added protection these alarm sets may be equipped with automatic shut-down in case signals are not heeded.

Since 1932 Synchro-Start has been manufacturing dependable controls including Solenoids, Overspeed Governors, Relays, Switches and pre-set automatic or manual Control Systems to start, stop and protect internal combustion engines.

Further information upon request.

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Impact of Automation Revealed at AIEE Conference

By Joseph Geschelin

THE amazing impact of automation and its allied problems on the manufacturing scene was indicated by the registration of over 700 production executives coming from all over the USA to attend the 7th Annual American Institute of Electrical Engineers Conference on Machine Tools held in Detroit at the end of last month.

The well rounded program included papers dealing with the status of automation; developments in the design of transfer machines; maintenance of machines, electric controls, hydraulic controls; preventive maintenance; introduction and improvements in industrial electronic controls; a panel discussion of electric clutches; automation in electronic inspection devices; and failure prevention in the operation of electrical machinery.

Interpretation

According to P. H. Alspach, General Electric Co., the proper interpretation of automation is "continuous automatic production," a way of manufacturing based on the continuous flow concept as distinguished from the batch or job lot concept. It makes for a new vista of increased productivity through the introduction of improved processes, with more and more automatic equipment. According to Alspach, automation must take advantage of the maximum extent of the developing art of chipless processes that produce parts to size in fewer operational steps.

It is up to progressive management to apply this way of manufacturing, determining in advance the degree of automation its particular business can support economically. Finally, Alspach said that automation will become irresistible in the years ahead and those who do not accept it undoubtedly will find themselves no longer competitive with the rest of the industry.

Transfer machines, the heart of automation machine lines, were discussed by Ralph E. Cross, The Cross Co., in the light of advanced design concepts that make the integration of such equipment flexible, lower in cost, and more susceptible of changeover to suit changes in product design. At Cross this concept is tied intimately with the philosophy of modular construction. Machine tool modularization, according to Cross, may be defined as building machines from standard components or building blocks, a process that may be likened to Erector set design.

Specific Illustrations

Mr. Cross then gave some specific illustrations of transfer machines of various types and functions integrated from standard building blocks. One example is a pallet type transfer machine built up of standard bed sections, pallets, pallet clamping units, wing bases, feed units, transfer mechanism, and conveyor. Any type of work holding fixture can be adapted to the pallets and any type of tool can be adapted to the feed units.

An even more complicated form of transfer machine, produced by modular construction, is one for machining V-8 engine cylinder blocks. It is 350 ft long, performs 555 operations, has more than 100 blocks in process simultaneously, and is controlled by a single operator.

When such complication has been achieved, it is necessary to provide a memory unit to aid the operator in keeping track of the multiplicity of tools. This is done by the familiar Cross Toolometer. All Toolometers are electrically interlocked with the machine cycle, keeping track of the number of operations performed by each tool. When one of the indicator hands reaches zero position, indicating it is time to change the tool, the machine is automatically stopped.

Segmented Automation

Cross also touched on another of the basic concepts in automation—the principle of sectionalized or segmented automation. In this concept, a given large machine or department, for that matter, is divided into distinct sections in such fashion that any one section can be shut down for any cause without interrupting the automatic cycle of the rest of the machine or department. Each section has its own transfer unit to index the work from station to station.

Finally, Cross urged development of better building blocks to facilitate faster changeover. This is particularly true of electrical components and, in his opinion, the answer lies in the availability of plug-in control circuits to handle the various mechanical components.

Automation is many things. One of its applications

(*Turn to page* 210, *please*)

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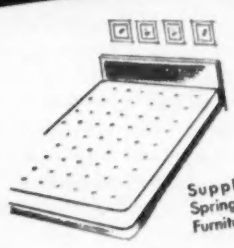
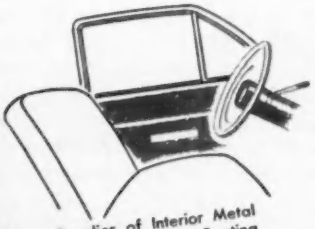
Symbol of Service for 48 years . . .



Supplier of Inner Coil Spring Units to Mattress and Furniture Manufacturers.

Supplier of "Star Service" All Wire and "Paper-Strut" Garment Hangers to Cleaners and Dyers.

Supplier of Brake, Clutch, Valve, and Other Mechanical Springs to the Automotive and Other Industries.



Supplier of Interior Metal Trims and Spring Seating Units to the Automotive Industry.

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Additional *New Developments* at National Metal Show

By H. H. Roberts

As usual, great interest was shown by the throngs which attended the National Metal Exposition held at Chicago's International Amphitheatre last month. This was the 36th annual event and was the ninth of the series to be held in Chicago.

The Industrial Heating Equipment Association sponsored three well-attended sessions on furnace atmospheres and induction heating. They were highlighted by the presentation of significant case studies.

Numerous new products and processes were shown at the booths of 445 exhibitors. Although a preview of the National Metal Show, together with descriptions of many of the offerings appeared in the November 15 issue of AUTOMOTIVE INDUSTRIES, the following descriptions of new developments includes some which were observed during the show, and did not appear in the earlier issue.

The Torrington Manufacturing Co. unveiled a new W-10A Springmaker at the show. Weighing 695 lb, the W-10A Springmaker can handle 0.008 to 0.028-in. wire ranging up to 24 in. in length. Outside diameter of the machine's coils range from 1/16 to 7/8 in. Extra wire feed gears permit the handling of up to 36-in. lengths of 0.008 to 0.024-in. wire and up to 48-in. lengths of 0.008 to 0.020-in. wire. The new machine will produce from 24 to 243 springs per minute with a motorized variable speed transmission and from 21 to 240 with an electronic adjustable speed drive.

Leeds & Northrup announced the extension of their Homocarb furnace line to include a gas-fired model, made in eight sizes, with work spaces from 15 in. by 18 in. to 25 in. by 48 in. The furnaces are vertical, batch type units, identical with other Homocarb furnaces except for method of firing. The burners are tangential to the combustion chamber, and the number of burners depends on furnace size. Burners are luminous-flame type, and the use of these burners, with regulation by Duration-Adjusting Type (DAT) temperature control, produces a long flame which wraps around the furnace retort. The retort thus becomes a single radiant tube, supplying a uniform wall of heat around the work chamber.

Two new accessories, designed for use with the Brush Surfindicator (an instrument for measuring surface finish roughness), were displayed by the Brush Electronics Co. One of these is the motor drive, Model BL-114, used for mechanical tracing of the Surfindicator pick-up. The tracing accessory has a reciprocating stroke with a length adjustable from 2⅞ in. to less than 1/16 in. The stroke speed is constant at ⅛ ips. Instantaneous reversal and constant speed are said to assure surface roughness measurements with a high degree of accuracy. A complete set of linkages and couplings provides a means of horizontal and vertical adjustment of the Surfindicator pickup to the surface to be inspected. The second accessory, a small bore adapter, Model BL-113, extends the usefulness of the Surfindicator from general purpose pickup to very small internal diameters and other limited access areas. Basically, the adapter consists of a precision lever which is attached to the general purpose pickup instead of the standard rider head. The small dimensions of the tip of the adapter permit measurements inside holes as small as ⅛-in. diameter. It is also used on gear teeth, slots, lands, etc.

Sciaky Bros., Inc., showed a model of the new SX 36 G standard multiple-gun base machine with fabricated steel superstructure for arrangement of guns and transformers. A Sciaky standard machine, the SX 36 G consists of a universal multiple gun base with two separate platen units. The platen units, operating independently, load in extended position—swing-in and lift to the welding position—and after the welding sequence is completed, retract and swing-out for unloading. The Sciaky standard base unit has been developed for easy attachment of special superstructures designed to support and locate transformers, welding guns, and the hydro-pneumatic boosters to suit the configuration of particular welding applications. The components can be re-arranged to fit any other application within the capacity of the base unit. The platen lift and retraction feature permits multiple spot welding of deep drawn sections. The swinging in-and-out facilities loading and unloading.

The Renite Co. had a special display of new smokeless forging die lubricants and Moto-Spray electrically-actuated, oil-operated spraying equipment for applying Renite lubricant to both dies for many forging jobs. Special sprays are available with one, two, or more jets and with internal valves for use on upsetters. Renite is said to eliminate smoke and fumes, increase die life, and permit forging to more uniform tolerances.

An unusual display was that of the Bakelite Co. which showed the use of epoxy resins for making metal-forming tools, dies and jigs; for glass-fiber reinforced checking fixtures; and for bonding cloth or

(*Turn to page* 196, *please*)

We put Hydraulic Cylinders on a reducing diet

RESULT:

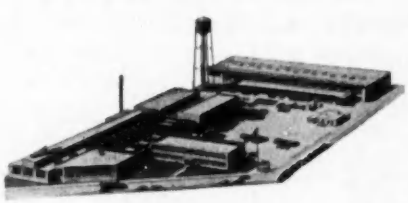
The New VICKERS® "Compact" HYDRAULIC CYLINDERS

For 2000 PSI Working Pressure

Everybody agreed that hydraulic cylinders were just too fat . . . took up too much space. So our engineers put them on a reducing diet. The result . . . these slim, powerful, "Compact" cylinders fit and work in spaces where the old type could not. It is part of Vickers long-time program of continuous improvement.

Among their many other features are: Multiple port positions. Spring-loaded synthetic-impregnated leather rod seal compensates for wear, assures long service. Piston seals are improved cup type. Tie rods are high tensile alloy steel. Adjustable integral hydraulic cushions are available. Comply with JIC standards. Conservatively rated for maximum working pressure of 2,000 psi. For further information, see Bulletin 54-68.

Waterbury Tool Division of Vickers Incorporated where "Compact" Cylinders are manufactured.



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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Continued from Page 39

Corporation Profits Climb in 2nd Quarter

How lower excess profits taxes have affected profits of manufacturers is pointed up in a report issued by the Federal Trade Commission. Automotive companies, for example, netted $340 million in the second quarter this year, compared with $272 million in the like three months last year, despite lower sales this year.

While corporate excess profits taxes were voted by Congress last year, they did not become effective until the beginning of this year. Combined profits of all manufacturers went up to $2.900 billion, 13 per cent over the first quarter. However, total earnings in the second quarter this year were about four per cent under the comparable period last year.

DeSoto Sets Its Sights On 175,000 Cars in '55

DeSoto, which has invested $2 million on its advertising campaign to launch its new cars on Nov. 17, is setting its sights on production of 175,000 cars for 1955. This would be about 45,500 more units than the division produced in 1953, its best year.

J. B. Wagstaff, vice-president in charge of DeSoto sales, said, however, that the conservative estimate would be about 155,000 units, which would still mean a 15 per cent increase over the all-time high year. DeSoto's goal is to boost its market penetration to at least three per cent. At present, the division's share of total industry market is slightly over one per cent.

DeSoto's production has dropped severely in 1954. In the first 10 months of this year, DeSoto turned out around 50,000 units, against more than 100,000 for the same period last year.

FLEX TESTER FOR LEATHER

The dynamic flex tester shown here permits the testing of fabrics at any temperature or atmosphere condition. Developed through the joint efforts of the automotive industry, the makers of leather finishes, and Government laboratories, it is used primarily to test finishes which give surface protection to leather.

Demand Seen Waning For All-Black Cars

The all-black car is slowly fading out. The color is being pushed far down the list by the lighter hues and two-tones. For example, black Chrysler lines accounted for only about six per cent of total production this year against eight per cent last year.

Black at Ford is down anywhere from two per cent to six per cent in the various series compared to 1953. The blue-gray range of colors at Chrysler account for about 40 per cent of total production, while blue and green seem to be the most popular at Ford.

(*Turn to page* 200, *please*)

ONLY TWO OF NINE SECTIONS SHOW PERCENTAGE INCREASE IN EIGHT MONTHS

Regional Sales of New Passenger Cars

Zone	Region	August 1954	July 1954	August 1953	Eight Months 1954	Eight Months 1953	Per Cent Change: Aug. over July	Aug. over Aug. 1953	Eight Months 1954 over 1953
1	New England	24,196	29,946	27,719	227,974	226,831	−19.20	−12.71	+ .64
2	Middle Atlantic	87,765	93,427	100,094	729,101	753,749	− 6.06	−12.32	− 3.27
3	South Atlantic	54,154	55,567	55,313	439,573	441,518	− 2.54	− 2.10	− .37
4	East North Central	109,567	115,767	128,607	950,370	1,026,087	− 5.27	−14.73	− 7.38
5	East South Central	21,600	20,750	24,377	182,757	184,544	+ 4.10	−11.39	− .97
6	West North Central	44,267	47,774	55,094	370,070	395,938	− 7.34	−19.65	− 6.53
7	West South Central	42,781	49,390	46,943	359,534	356,020	−13.38	− 8.87	+ .99
8	Mountain	14,442	14,415	13,702	111,746	125,732	− .51	+ 3.99	−11.12
9	Pacific	41,540	47,280	50,491	358,166	406,119	−12.14	−17.73	−11.81
	Location Not Determinable	.....	.....	.....	1,837	.....	.....	.....	.....
	Total—United States	440,312	474,316	502,430	3,731,428	3,916,238	− 7.17	−12.36	− 4.72

States comprising the various regions are:—Zone 1; Conn., Me., Mass., N. H., R. I., Vt.—Zone 2; N. J., N. Y., Pa.—Zone 3; Del., D. of C., Fla., Ga., Md., N. C., S. C., Va., W. Va.—Zone 4; Ill., Ind., Mich., Ohio, Wis.—Zone 5; Ala., Ky., Miss., Tenn.—Zone 6; Iowa, Kan., Minn., Mo., Neb., N. D., S. D.—Zone 7; Ark., La., Okla., Tex.—Zone 8; Ariz., Colo., Ida., Mont., Nev., N. M., Utah, Wyo.—Zone 9; Cal., Ore., Wash.

Dynamatic Eddy-Current Units can be put to work in your plant or product

This Free Booklet Will Show You How

Dynamatic eddy-current couplings, brakes, clutches, dynamometers, and Ajusto-Spede drives, in use today in practically every basic industry in both plant equipment and end products, are proving the ideal solution to difficult speed control and testing problems. Advantages include instantaneous response, infinitely adjustable speed control, wide speed range, quiet operation, low power loss, low maintenance cost, adjustable speed from an AC power source.

Our new booklet "Bulletin GB2" describes and illustrates the basic Dynamatic eddy-current units, including the new stationary field coupling. The text, augmented with illustrations and graphs, describes the basic eddy-current principles and drive characteristics. If you are interested in modern speed control, write for your copy of the new Dynamatic Bulletin GB2.

DYNAMATIC® DIVISION

EATON MANUFACTURING COMPANY

KENOSHA, WISCONSIN • General Offices: Cleveland, Ohio

Transmission Automation With Power-and-Free Conveyors

(*Continued from page* 68)

work it is delivered to the rework stations.

At present there are eight rework or repair stations, each one served by an air lift as in the case of the test stands. When repairs have been made—whether the trolley originates on the assembly line or test stand, it is routed into a test stand for test or retest, according to its requirements.

Button-up conveyors receive trolleys from the delivery conveyor through selector operated switches that accept all trolleys except those set for rework. Trolleys roll by gravity to a point where they are engaged by the pusher dogs of the drive conveyor and then move at a set rate and spacing. At the end of the line, the trolleys are released and roll by gravity to a stop-and-feeder which ejects them onto the delivery conveyor to storage ahead of shipping.

It may be noted at this point that the button-up department has a special by-pass loop assigned to quality control. Inspectors are free to select certain transmissions during the production run and consign them to a special test run.

Immediately following button-up is a final inspection station. If a transmission is rejected here, it is routed to repair spur; otherwise, the trolleys proceed to the storage area ahead of shipping. Storage conveyors receive trolleys through a series of preset selector-operated switches. Trolleys roll by gravity to a position where they are engaged by the pusher dogs of the storage conveyor drive, then are moved to the unloading end where they are stopped by stop-and-feeder units. Trolleys then are ejected onto the shipping conveyor in a sequence established from a control panel.

There are two shipping spurs, provided with special air lifts, receiving trolleys through a set of selector operated switches. Trolleys roll by gravity to a stop-and-feeder ahead of the air lift. When the air lift is empty the trolley is released and rolls into position. The operator then actuates the air lift to lower the transmission into the shipping rack. Following this he turns the selector switch to empty, actuates the air lift to raise it, and the empty trolley then rolls by gravity to a stop-and-feeder for transport on the shipping conveyor.

The delivery conveyor to empty storage receives trolleys from the shipping conveyor as well as from storage conveyors, empty trolleys then being delivered to the final assembly line. When the latter becomes filled with empty trolleys, they by-pass and are returned to storage.

A noteworthy feature of this installation is the provision of a master control panel, as illustrated. The vertical board shows the complete network of conveyors in the system described here. Tell-tale lights indicate whether individual lines are operating or are shut down. In addition, there are three calibration switches controlling the speed of conveyor lines in accordance with the established production rate in units per hour. One of these controls the group of two final assembly lines and feeder monorail in synchronism. The shipping bay has a smaller control panel for scheduling to the shipping dock, entirely independent of the main control.

At present the power-and-free conveyor system has 500 trolleys, while the parts delivery monorail has 256 carriers each designed to hold all of the components required for a transmission.

The entire system is composed of the following conveyor lines:

Sub-assembly delivery monorail	670 ft
Final Assembly line conveyors	395 ft
	370 ft
Delivery—final assembly to storage	545 ft
Delivery—storage to test stands	358 ft
Delivery—test to repair and button-up	396 ft
Button-up conveyors	82 ft
Delivery—button-up to storage	386 ft
Delivery—storage to shipping	679 ft
Delivery—empties to storage and assembly	268 ft
Storage—assembly before test	936 ft
	900 ft
Storage—assembly before shipping	636 ft
	540 ft
Storage—empty carriers	312 ft

Total developed length of the system runs some 7473 ft in length. Incidentally, many details covering operational features have been omitted from the above outline in view of space limitations.

As mentioned at the outset, the only transfer machine currently in this plant is the enormous group of Snyder equipment on the transmission case. Composed of four separate transfer machines, tied together with automation, the equipment runs some 150 ft in length. The illustrations reproduced here show part of the setup which includes an Ingersoll milling machine at the start of the line; Ex-Cell-O boring and facing machines; and Hoern & Dilts turning and boring machines at the end of the line.

The first unit in this line is a 19-station Snyder transfer machine for milling the ends and pads; boring and facing. Station 3 handles milling on right and left hand sides. Station 6, RH side, rough-bores two large diameters, rough-faces; LH side, cross-faces large bore. Station 8, RH side, semi-finish bores the rough-faced diameters, rough-bores a large diameter; LH side, cross-faces to final dimension. At Station 10 the part is tilted 90 deg, using a simple automatic fixture built into the machine. Station 12, RH side, finish mills rear valve mounting flange. Station 14, RH side, rough-mills front valve mounting surface. Station 16, RH side, finish mills shifter shaft boss. Station 18, RH side, has angular spindle for finish-milling clearance on center anchor support.

The next Snyder unit is a 31-station transfer machine for drilling, counter-sinking, and reaming in the bottom and rear end of case. This section, which comprises a combination of right and left hand, horizontal, vertical and inclined heads, has a total of 182 spindles in action. Station 30 is another of the simple, automatic tilting and roll-over fixtures—tilting the work 90 deg and rotating it 90 deg clockwise to present the case resting on the bottom face with rear end forward for the next operation.

The third unit is a 17-station Snyder transfer machine for drilling, countersinking, spot-facing, reaming and tapping holes in the sides of the case. This machine is composed primarily of horizontal and inclined units, with 42 spindles in action. At Station 15 the work is automatically tipped and turned. At Station 17 the part is rotated 90 deg, then tilted 90 deg so the front face is up while the bottom face is on the right side.

The last unit in line is a 24-station Snyder transfer machine for drilling, chamfering, rear bore facing, and tapping. It is composed essentially of horizontal units on right and left hand sides, with 103 spindles in action, including spindles for large bores. At Station 16 is another of the automatic fixtures designed to tilt the case 90 deg so the bottom face is down while the front face is to the right. Cases are unloaded at Station 24, and move to the next operation on a gravity roller conveyor.

One of the distinctive features of the transfer machine installation is

(*Turn to page* 111, *please*)

Production Pointers from GISHOLT

GISHOLT TIME-SAVING IDEAS

Presented as a service to production men, we hope some of these interesting ideas, chosen from thousands of jobs, will suggest ways to help you cut time and costs in your own work.

AUTOMATIC LOADING GIVES PRODUCTION A BIG LIFT

Simplimatic lathe gets "Automation" assist

It wasn't the machining job itself. That's done with speed and precision on the Gisholt Simplimatic Automatic Lathe. But the real trick was getting the big, heavy workpieces on and off the machine. Slow, awkward handling was penalizing production. So this special handling equipment was devised.

The same basic tool setup is used to machine six different sizes of motor frames—with tools on two vertical slide housings doing finish facing, boring and chamfering at both ends of the housings.

push-button loading

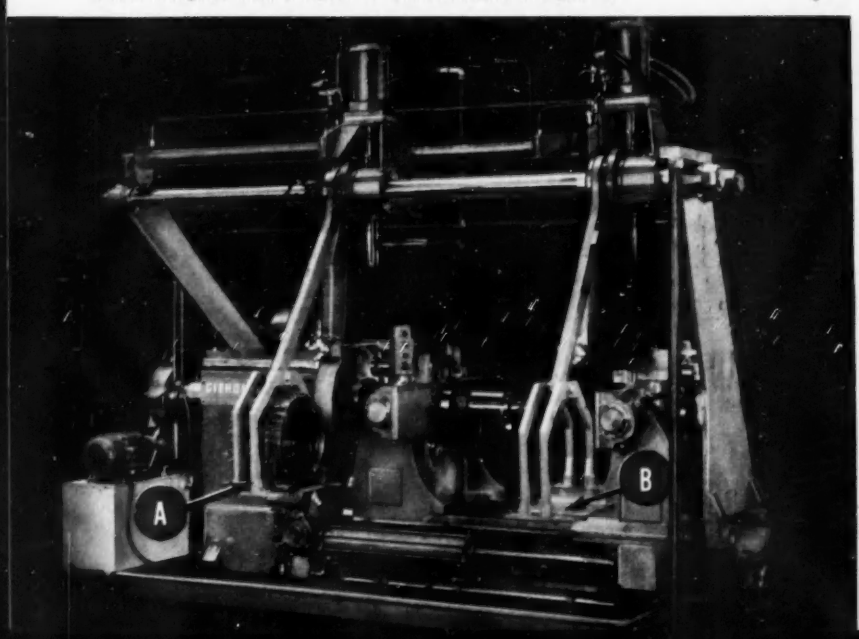
Note the special loading and unloading device. It works this way: Motor frames are slid from a conveyor onto loading cradle "A." At the push of a button, the frame swings in between the vertical slide housings and then moves longitudinally until it is over the expanding-type arbor, ready for chucking. A manually-moved locating stop positions the frame. After chucking, the loading cradle retracts, permitting the outer vertical slide housing to move in and support the mandrel during machining.

While the Simplimatic goes through its automatic cycle, the operator readies another part by re-loading the cradle. Unloading of the machined part is handled by the second cradle "B" which swings in between the housings and takes the frame as the mandrel releases. Floor to floor time for the largest frame is 3.5 minutes.

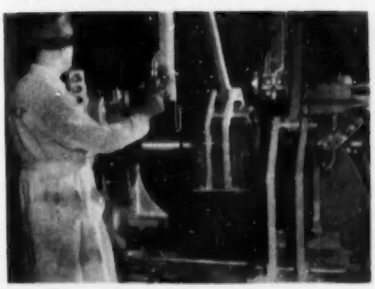
Changeover is fast. Removable guide rails are used in the cradles for locating and loading the frames. Different bore sizes are accommodated by removable shoe segments on the expanding mandrel. A crank arrangement repositions the outer slide housing for different frame sizes. Tool slides have micrometer-type adjustment screws with dial indicators for fast, accurate tool setting.

Faster loading and unloading of heavy parts with this special device increase productive time of the Simplimatic, lessen operator fatigue, cut costs. It is another example of the trend towards "automation."

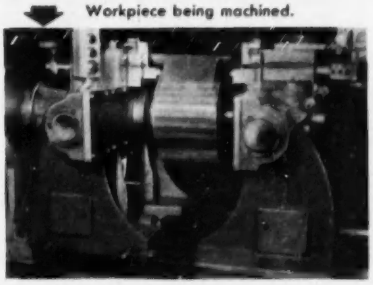
Simplimatic Automatic Lathe with overhead-mounted hydraulic-operated loading/unloading device. Workpiece loads at cradle "A" and is unloaded on cradle "B."



Operator pushes button to start loading cradle into position to chuck part.



Workpiece being machined.

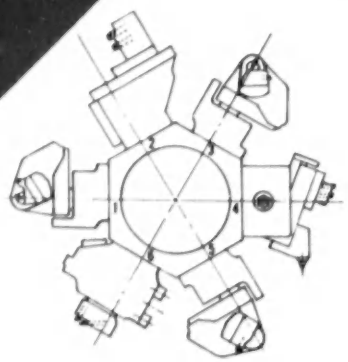


GISHOLT

TIME-SAVING IDEAS

SINGLE-TOOL WORK PUT "ON THE DOUBLE"

Unique Fastermatic setup generates radii with swinging tools

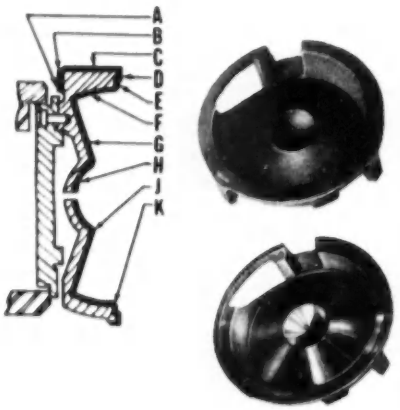


Only single-tool or generated cuts could achieve the accuracy and finish required for the seat faces and snap-fit diameters on these parts for water meter chambers. Note how the problem is solved by two Gisholt 1F Fastermatic Automatic Turret Lathes with a unique tooling setup. Nickel-iron workpieces come to the machines with reverse sides machined, drilled and bolted on chucking plates.

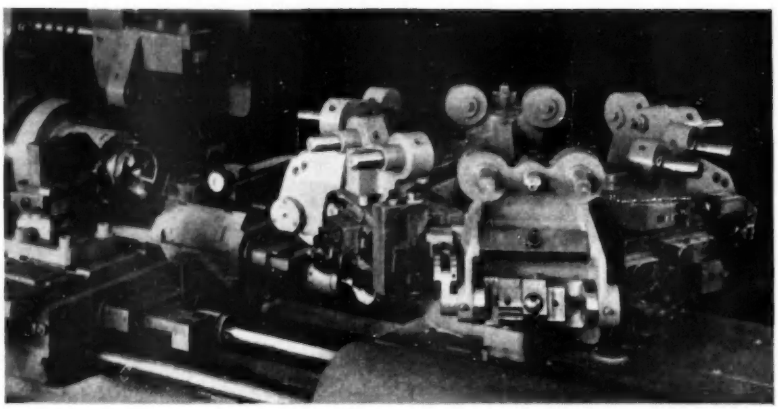
Here's the operational sequence:

Turret 1—Generate radii F and H.
Turret 2—Rough and finish turn C.
Turret 3—Burnish radius H and break corner K.
Turret 4—Finish face G and chamfer J with angular mounted slide tool and turret facing attachment.
Turret 5—Finish generate radius F.
Turret 6—Finish face D and E.
Front C/S—(Not shown on drawing)—Finish face A, semifinish face D and chamfer B.

One man and two Fastermatics with single-point tooling produce 320 parts per 8-hour day with this novel setup—12% better output than former way.

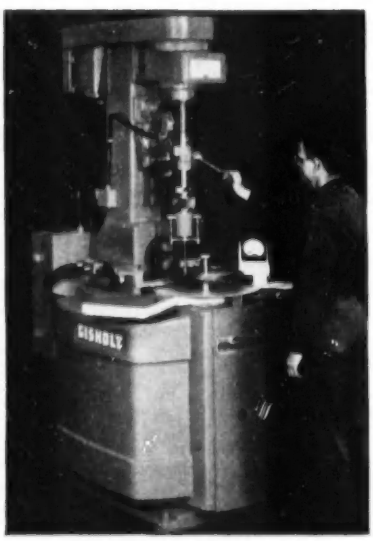


Special radius generating tooling on hexagon turret stations.



BALANCING AND CORRECTION COMBINED IN ONE HANDLING

Built-in Drill Spindle Speeds Output of Gisholt DYNETRIC Balancer



The design of the improved Gisholt 1SV1 Static Balancer easily permits the addition of correction equipment, such as drill spindles and welders. This makes production balancing simpler, faster and less expensive than ever.

Note how this well-known manufacturer is balancing flywheels. The cast iron parts are held on an expanding arbor and rotated. The operator notes the angle and amount of unbalance. The amount is indicated in terms of drill depth on the direct-reading meter located conveniently beside the work and the angular location is indicated by the number observed on a dial under a stroboscopic lamp.

Stopping the machine, the operator indexes the part for correction drilling at the location specified. Movement of the feed lever brings a thrust support under the workpiece and starts the drill. The vacuum chip remover comes down with the drill, removing the chips as they are formed. When the reading on the drill depth dial corresponds with the indicated amount of unbalance, the drilling is stopped.

In this efficient setup for measuring, locating and correcting unbalance in one chucking, output is at the rate of 53 parts per hour at 80% efficiency.

DYNETRIC BALANCER GISHOLT

Ask for information on courses offered by *Gisholt Balancing School.*

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TIME-SAVING IDEAS

CONTOUR BORING ON FIXED CENTER TURRET LATHE?

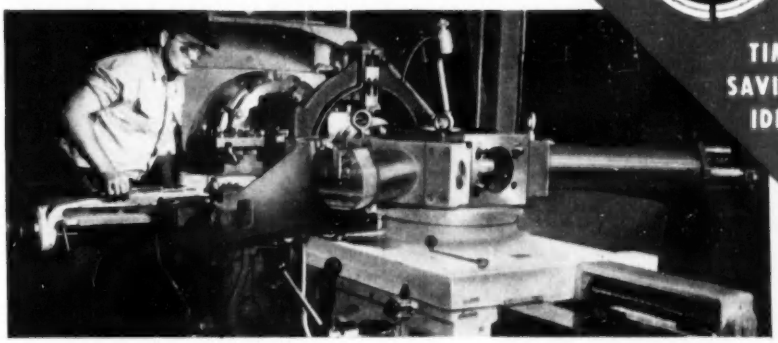
Special tooling and cam plate show the way

This workpiece is large, awkward and unwieldy. It's a gun recoil mechanism cradle assembly—28″ long by 19½″ in diameter.

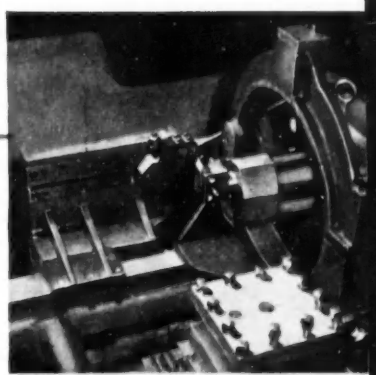
The job starts with the bore being chamfered from the square turret. A live center supports from the hexagon turret while square turret tools face the end and turn the O.D. Then a steadyrest is moved to support the part on the machined O.D. and the end is finish faced from the square turret.

Of special interest is the method for final contour boring achieved by a cam plate mounted on the rear bedway. A special trunnion, with one arm carrying the cam follower and the other carrying the boring bar and tool, pivots through the hexagon turret mounting. The boring tool alternately raises and lowers with the cam as the hexagon turret carriage feeds in toward the headstock.

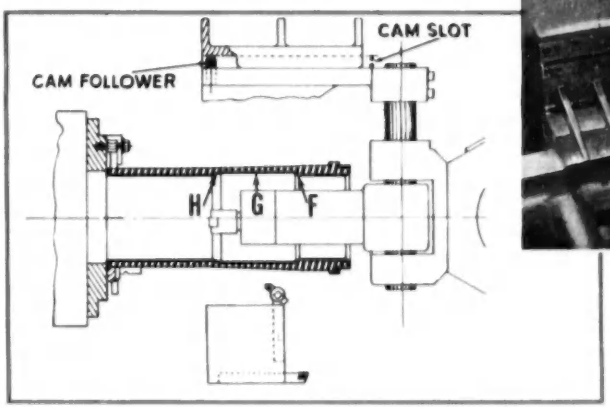
In this novel setup, accurate contour boring is easily accomplished by a cam-guided tool on this fixed center hexagon turret lathe.



Close-up shows angle plate on bedway and cam arrangement for guiding boring bar on fixed center turret lathe.

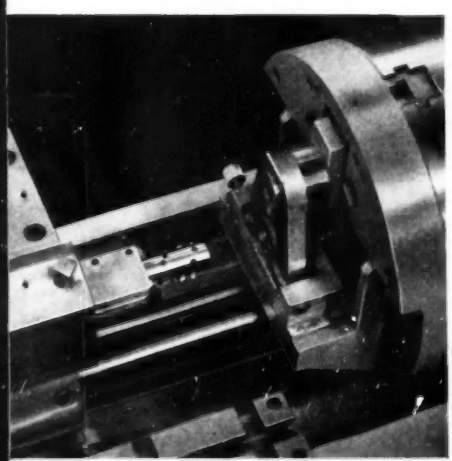


Contour F-G-H handled with special cam attachment. Other surfaces machined in conventional manner.



A FIRST-RATE JOB OF HOLDING AND MACHINING

Quick Changeover for Five Sizes Keynotes No. 12 Hydraulic Job

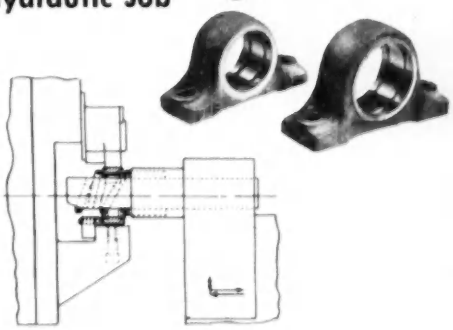


Single floating jaw in counter-balanced chucking fixture works for five sizes.

How to set up for simple, speedy machining and changeover for various size parts is nicely illustrated here.

This Gisholt No. 12 Hydraulic Automatic Lathe handles all production requirements for five sizes of cast iron pillow blocks. Holding is provided for by a special fixture mounted in a standard 3-jaw air chuck. Clamping pressure is applied to the feet, thus eliminating any distortion.

A single boring bar held in the front carriage does rough and finish boring and chamfering with longitudinal movement and then straddle faces, cuts snap ring grooves and chamfers with transverse movement. No tool marks left in the bore this way. Part sizes vary from 1.378″ to 2.440″ in the bore and time ranges from 1.3 to 1.9 minutes f.t.f.



Changeover is simple. For tooling, a new boring bar is added. For chucking, the centerline is changed with a riser plate. That's all there is to it.

A good example of how rough and finish machining of various size parts is speeded with separately tooled, easily changed boring bars.

GISHOLT

TIME-SAVING IDEAS

3-IN-1 SETUP SAVES EXTRA OPERATIONS

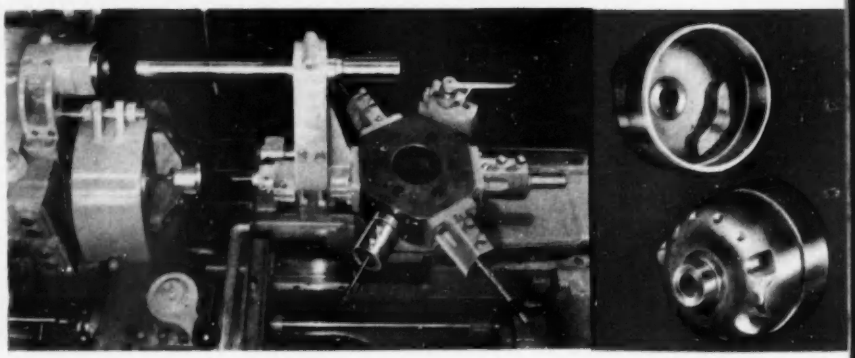
Machining, Broaching, Pressing Done on One Machine

Whenever you can combine three operations in one, you're time and money ahead. One such "how-to-do-it" is illustrated here... in the production of these fractional horsepower electric motor housings.

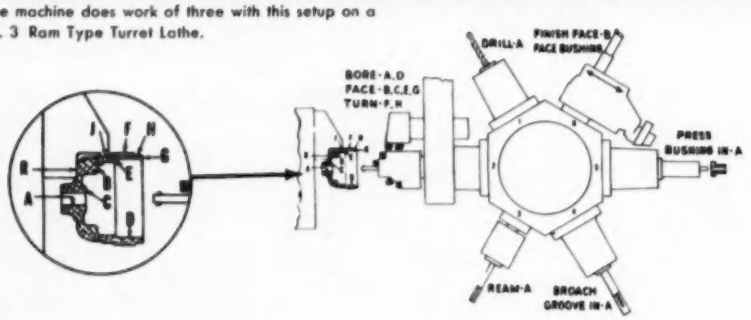
Instead of machining and then broaching a locking groove and then pressing in a bushing—as separate operations—this Gisholt No. 3 Ram Type Turret Lathe is expertly tooled to perform the *entire* job.

The layout shows how tools on the hexagon turret, in addition to standard machining, broach the groove and press in a bushing—all in one chucking. To complete the operation, the bushing and the housing are both finish faced from the last hexagon turret face. Time is only 1.37 minutes.

By skillfully doubling up operations on one machine, this producer eliminated a great deal of rehandling, saved real time and money in production.

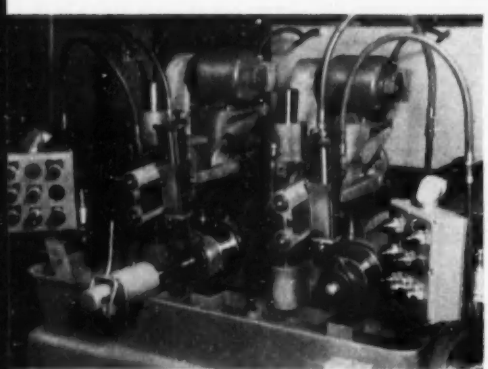


One machine does work of three with this setup on a No. 3 Ram Type Turret Lathe.



PARTS SUPERFINISHED AT RATE OF 140 PER HOUR

One operator tends two-spindle machine



Showing setup of Gisholt Two-Spindle Superfinisher, with push-button control panels for each station.

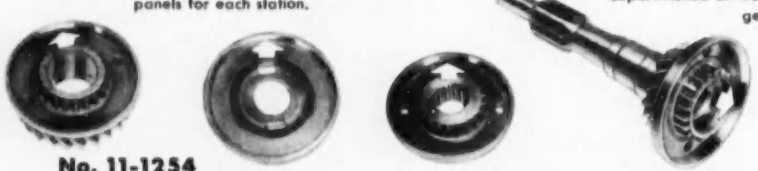
This European manufacturer had the problem of Superfinishing four different transmission parts, including a gear and shaft assembly plus three similar gear parts as shown. The requirement was for high production and, naturally, for the most economical method.

The practical solution was worked out by Gisholt engineers using this No. 54 Two-Spindle High Production Superfinisher. Since both stations have a fully automatic machine cycle, only one operator is needed to load and unload parts, alternating between stations. Note that each station has its own separate push-button control panel so that after loading, the operator merely engages the cycle start button.

The left-hand spindle station is in continuous production on gear and shaft assemblies. The right-hand station has tooling setup changes for the 3 other gear parts. On all workpieces, Superfinish is performed on a 7 degree tapered surface on the backrim I.D. Surface reading of from 25 to 30 micro-inches is reduced by Superfinishing to 4 micro-inches or less. With floor-to-floor time of only 35 seconds per part, total production is 140 parts per hour at 80% efficiency.

With this high-production setup, one machine and one operator handle a variety of parts to easily meet production requirements—and with real economy.

Arrows indicate surfaces Superfinished on transmission gear parts.



No. 11-1254

631

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Transmission Automation

(*Continued from page* 106)

the first example we have noted of the Snyder Cy-Co-Trol tool control board which serves as storage for tools and contains calibration dials for tool life control at individual stations. A number of these boards are found in this area.

Final operations take place in a group of Ex-Cell-O precision-boring machines. First in line are two, two-way, four-spindle machines for finish-boring, facing, and chamfering a number of large diameter stepped bores. Next are two special four-station facing machines for finish-facing both ends as well as the bottom of the 5.876 in. diameter bore.

Two special Hoern & Dilts, vertical indexing, four-station, three-spindle milling machines are set up for finish-facing the two sealing surfaces on the pan side of the case.

Pressing-in and reaming of a bushing, and drilling two fine holes is accomplished in a special three-way pressing and drilling machine by Avey. At the end of the line the cases are given a thorough cleaning in a large Centri-Spray, fixture type washing machine.

Interesting too is an example of what is considered to be the largest multiple-tool nut runners used in the industry. As illustrated, it is an 11-spindle Ingersoll-Rand nut runner for making up the fastenings on torque converters. Each assembly has 22 fastenings, requires double-indexing to complete the operation.

BOOKS . . .

MONOPOLY AND COMPETITION AND THEIR REGULATION, *edited by E. H. Chamberlin, published by St. Martin's Press, Inc., 103 Park Ave., New York 17, N. Y. Price, $7.50.* This book provides an up-to-date examination of the problem of monopoly in nearly all major countries of the Western World. It consists of a symposium made by leading economic theorists. The occasion of this symposium was the third conference of the International Economic Association, at which the subject selected for study was Monopoly and Competition in Modern Society. It records comparisons of monopoly problems to illustrate differences of incidence between the countries represented. A short summary of the discussions arising from these comparisons is included.

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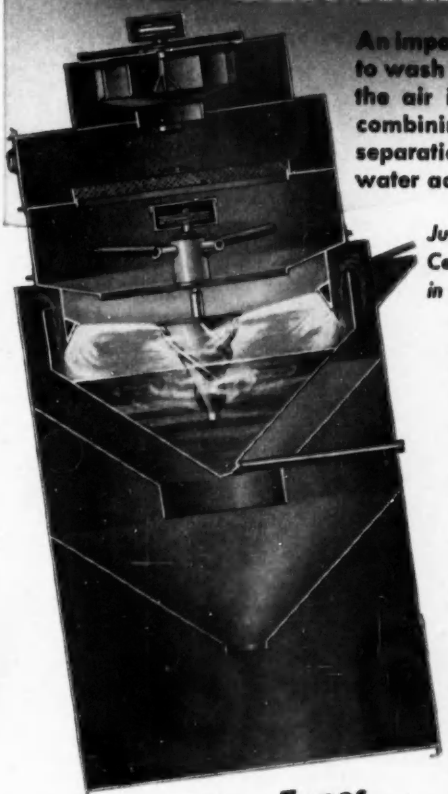
Schmieg CENTRI MERGE

Vertical Rotor Type DUST and FUME Eliminators

FOR THE MOST Economical COLLECTION and ELIMINATION Efficiency



An important new Schmieg development to wash hazardous dust and fumes from the air in a rotating torrent of water, combining the cyclonic principle of dust separation and *positive* high pressure water action.

Just a few of many reasons why a new Centri-Merge unit is your best investment in operating efficiency and economy:

• Low ratio of power to rated capacity • High ratio of water circulated to air volume handled • Independently driven low speed rotor and fan permit adjustments to load and operating conditions • No slots or nozzles to restrict water action • Automatic liquid level control • Optional location of air inlet arm • Material disposal by drag conveyor, hopper tank skim-off or manual clean-out • Easy access to clean-out doors for cleaning while unit is in operation • Bearings located out of liquid, fully enclosed, lubricated from outside.

Available in Two Types

1. For wet collection and elimination only.
2. For primary dry and secondary wet collection and elimination, with built-in dry type pre-cleaner.

Capacities from 500 to 50,000 C.F.M.

Write or phone for your copy of Bulletin VU 8-53, describing the superior operating characteristics and maintenance advantages of the new Vertical Rotor Units. Then consult with Schmieg engineers to plan a Centri-Merge installation for maximum dust and fume collection and elimination efficiency in your plant.

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AI TABLOID

(*Continued from page 37*)

Inland Steel Co. plans to build a $6 million office building in downtown Chicago. . . . Rochester Products Div. of General Motors Corp. expects to complete a new administration building in February. . . . North American Aviation is planning a 150,000 sq ft administration building at El Segundo, Calif.

* * *

Reynolds Metals Co. is studying the possibility of erecting an aluminum plant in British Columbia. . . . American Steel Foundries is halting operations at its Newark, N. J., plant.

* * *

Sum of $40-50 million will be spent to expand Air Force bases in California, Nevada, and Arizona.

Vickers Armstrong Works of England has developed a muffler which is said to eliminate 99 per cent of the noise from a jet engine undergoing tests at full power on the ground.

* * *

Mansfield Tire & Rubber Co. has completed negotiations for establishing a $3 million tire and tube manufacturing plant in Alexandria, Egypt. . . . The Reflective Products Div. of Minnesota Mining & Manufacturing Co. will build a new plant at Guin, Ala.

* * *

Sun Oil Co. has announced plans to construct a new $9 million anhydrous ammonia plant at its Marcus Hook, Pa., refinery. Capacity is expected to be 300 tons a day.

* * *

ElectroMotive Div. of General Motors Corp. will begin production at its new plant north of Salt Lake City, Utah, after Jan. 1, 1955.

* * *

The Air Force has ordered into production the B-58 supersonic jet bomber at Convair's Ft. Worth, Tex., plant and the F-104 faster-than-sound fighter at the Burbank, Calif., plant of Lockheed Aircraft Corp.

* * *

It is reported that Fiat will soon discontinue production of its Model 500 (Toppolino) car. Its successor, details of which are still secret, reportedly will be lighter, larger, cheaper, and more economical to operate.

* * *

Automotive Spring Corp. of Detroit is increasing production capacity 50 per cent . . . American Cable-Link Co. has moved to a new Detroit location at 13446 Fenkell Ave.

* * *

Allegheny Ludlum Steel Corp. has opened a new tool steel warehouse and district sales office in Milwaukee, Wis. . . . Bohn Aluminum & Brass Corp. has a new sales office in Rochester, N. Y.

* * *

Towmotor Corp. is adding 155,000 sq ft of space to its Cleveland plant . . . Harvey Aluminum Co. is starting a $2 million expansion of its aluminum forging facilities.

* * *

Reynolds Metals Co. will install a new 6000-ton aluminum extrusion press at its Phoenix, Ariz., plant to produce aircraft structural parts for the Navy. . . . Harvey Aluminum Co. is studying new applications of aluminum in automobile construction.

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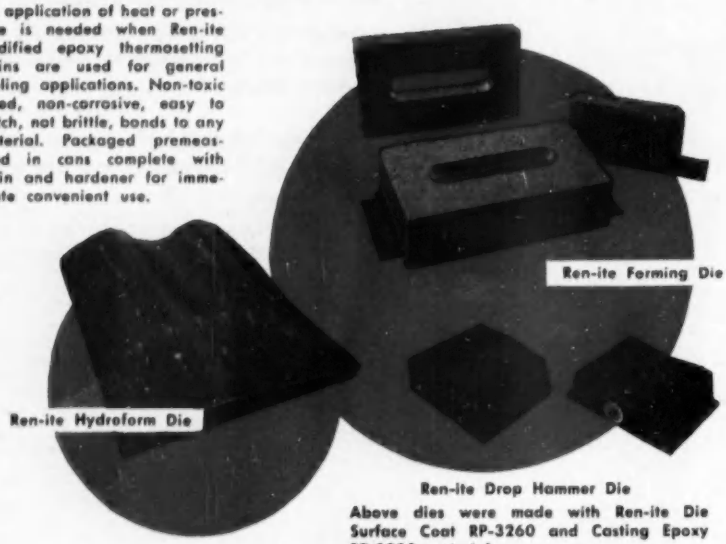

Above dies were made with Ren-ite Die Surface Coat RP-3260 and Casting Epoxy RP-3200 materials.

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Segmental bushings are made with slight bow.

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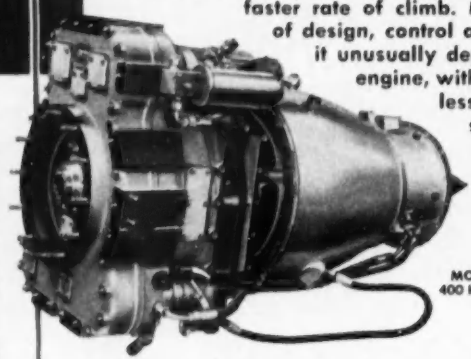
SIKORSKY'S XH-39 is notable for high performance—increased cruising speed, improved hovering ability, and faster rate of climb. Moreover, its simplicity of design, control and maintenance makes it unusually dependable. Although the engine, with all accessories, weighs less than 250 pounds, the ship accommodates up to 800 pounds of cargo. Payload space, in addition to pilot, is 81 cubic feet.



MODEL 220 C.A.E. 400 H. P. FIXED SHAFT TURBINE

Latest in a steadily-lengthening list of applications in which C. A. E. gas turbines are performing with distinction is this advanced helicopter, the Sikorsky XH-39. It is powered by the 400-h.p. C. A. E. Model 220 fixed shaft turbine, and holds the world's record for helicopter speed—156.005 m. p. h. A companion model developing 280 h. p. gives exceptional performance to the latest turboprop fixed-wing plane. . . . Two other C. A. E. turbine models—the J69 turbojet and the TC-104 air generator—also are making good on important assignments. The former, powering the Cessna T-37 twin jet trainer and the Ryan Q-2 Firebee target drone, has future promise, too, as auxiliary power for large planes. The latter is the nucleus of the MA-1 portable starter unit for large military jets, and is already in production at C. A. E.

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SUBSIDIARY OF CONTINENTAL MOTORS CORPORATION

De Soto Improvements for 1955

(*Continued from page* 56)

sion, safety-pedal power brakes, new heating system, and a high capacity air conditioning system.

The line-up of models is as follows: Fireflite V-8—four-door sedan; hardtop Sportsman; convertible coupe. Firedome V-8—four-door sedan; hardtop Special Coupe; hardtop Sportsman; convertible coupe; station wagon. Wheelbase has been upped by one-half inch to 126 in.

Perhaps the most important of the mechanical features is the change in engines. Basic specification details are given in tabular form, both Firedome and Fireflite V-8's employing the same basic engine. However, the Firedome engine is fitted with an improved two-barrel carburetor and has a new camshaft for smoother idle.

The Fireflite engine, on the other hand, employs a four-barrel carburetor, with two small primary venturi for controlling operation at low and medium speeds; while two secondary venturi come into play for high speed or quick acceleration. Throttle blades in the secondary venturi are vacuum-controlled through a diaphragm connected to the primary venturi. A mechanical overriding linkage ensures that secondary throttle blades will always close with the primary blades.

In addition to these details the Fireflite V-8 has a special high-output camshaft. Both basic engines have larger intake and exhaust valves. Hydraulic valve lifters now are made from newly-developed hardenable iron castings.

Coming to other mechanical details of the new cars, PowerFlite drive has a new panel-mounted selector lever with a short, direct-action linkage extending through the dash panel, clear of dirt and ice.

The new, low friction manual steering gear features a three-tooth roller gear mounted on roller bearings. All models have symmetrical idler arm steering linkage, as illustrated.

Front suspension is new, with direct acting shock absorbers mounted within the coil springs. Front wheel track has been upped to 60.22 in., 3.88 in. wider than last year. This, in combination with an extremely high roll center, is said to contribute to remarkably good cornering ability.

Similarly, at the rear, the new frame permits wider mounting of rear springs, the spring base being 5.06 in. wider than before. It is claimed this

The benefit that Aetna's manufacturing versatility can bring you is not fancy, but fact—proved by the experience of the nation's leading manufacturers in the automotive, farm implement, oil drilling equipment and general industrial fields.

If your product calls for ball bearings, roller bearings or hard-to-make precision parts just remember Aetna can supply them all . . . in the volume you need . . . to your most exacting metallurgical and precision specifications. And when you deal with Aetna you draw on a 38-year background of engineering knowledge and production experience hard to match anywhere. A letter or phone call will place our engineers at your disposal.

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reduces body roll on turns and makes for a steadier ride.

All cars have suspended brake pedals and dash-mounted brake master cylinder, nylon bushings replacing the former bronze bushings. On cars with optional power brakes, the vacuum power cylinder is combined with the master cylinder and is dash-mounted.

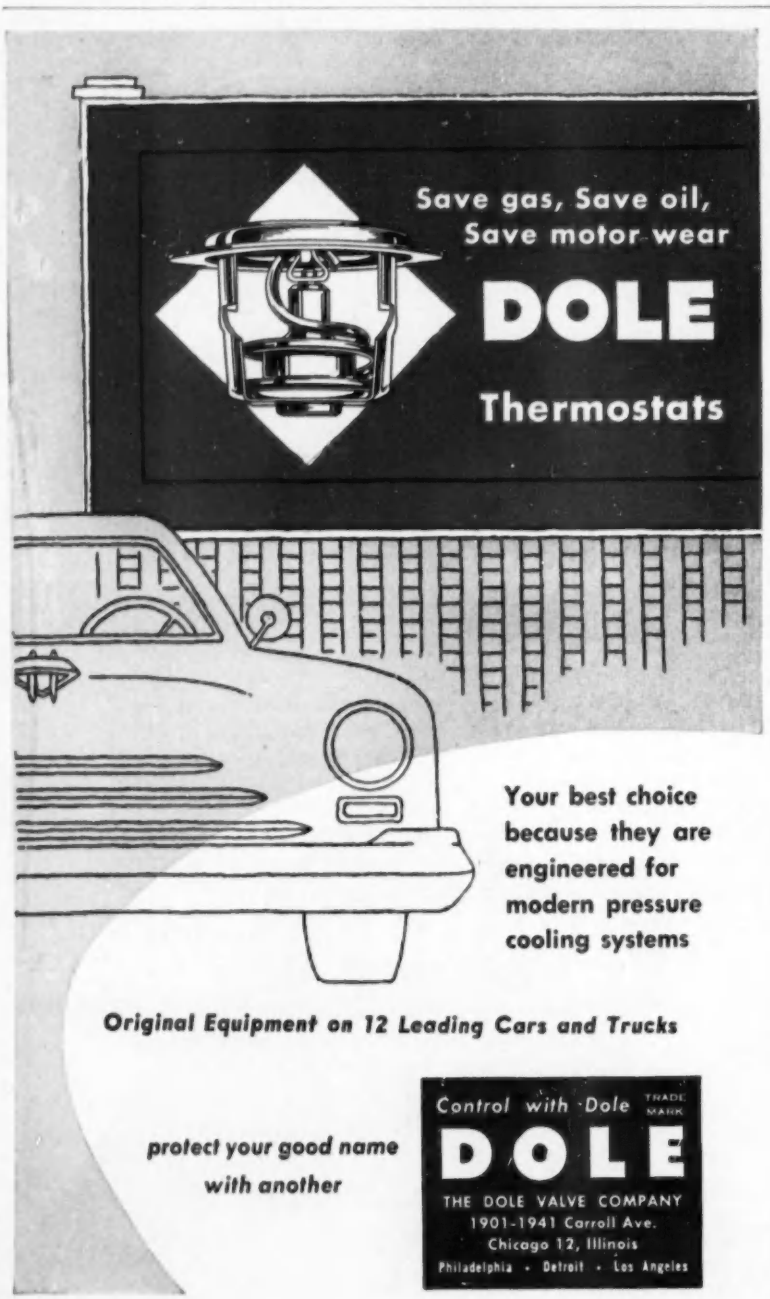
Cars specified with manual shift transmissions are also equipped with a suspended clutch pedal.

Bodies are entirely new with more massive and rigid construction. Among the special optional features made available are: four-way power seat control, power window lifts, search-tuning radio, rear compartment speaker, Solex glass.

Standard features include off-glass parking windshield wipers, inside lights, new insulation and body sealing.

Finally, De Soto offers a completely new heating and ventilating system and a greatly improved Airtemp car air conditioner. The heating system is mounted entirely on the dash. Separate switches allow individual control of heater and defroster blowers, accounting for better heating as well as up to 100 per cent more effective defrosting.

The new air conditioner employs a two-cylinder, reciprocating-type compressor with Freon 12 as the refrigerant. Three new features have been added—a magnetic clutch for off-on operation of the compressor; a single condenser; and a fast idle control, operative when the engine is in neutral, to increase cooling capacity and battery charging rate.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protect your good name with another
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THE DOLE VALVE COMPANY
1901-1941 Carroll Ave.
Chicago 12, Illinois
Philadelphia • Detroit • Los Angeles

Mercury Adds New Series

(*Continued from page* 57)

models. A fast getaway from a standstill is provided by permitting a start in low gear with throttle wide open through a specially designed kickdown while the selector is in drive position.

With Merc-O-Matic transmission, the rear axle ratio is reduced to 3.15 from 3.54. Rear axle ratio has been reduced to 3.73 from 3.91 with the new larger conventional transmission. The rear axle is larger than previously.

Tubeless tires are standard on all models. They feature a new tread design which is said to improve traction and virtually eliminate squeal.

Push button lubrication is obtainable as an accessory. This Multi-Luber system permits the driver to keep the chassis bearings under constant lubrication by pressing a button on the instrument panel.

Power accessories available as optional equipment at extra cost include power steering, power brakes, four-way power seat and power window lifts. Air conditioning also is available as optional equipment.

Montclair series includes a hardtop coupe, a Sun Valley hardtop with Plexiglas roof, and a convertible. The Monterey series presents a four-door sedan, a hardtop coupe and a station wagon. The Mercury Custom series offers a hardtop coupe, a four-door sedan, a two-door sedan and a station wagon.

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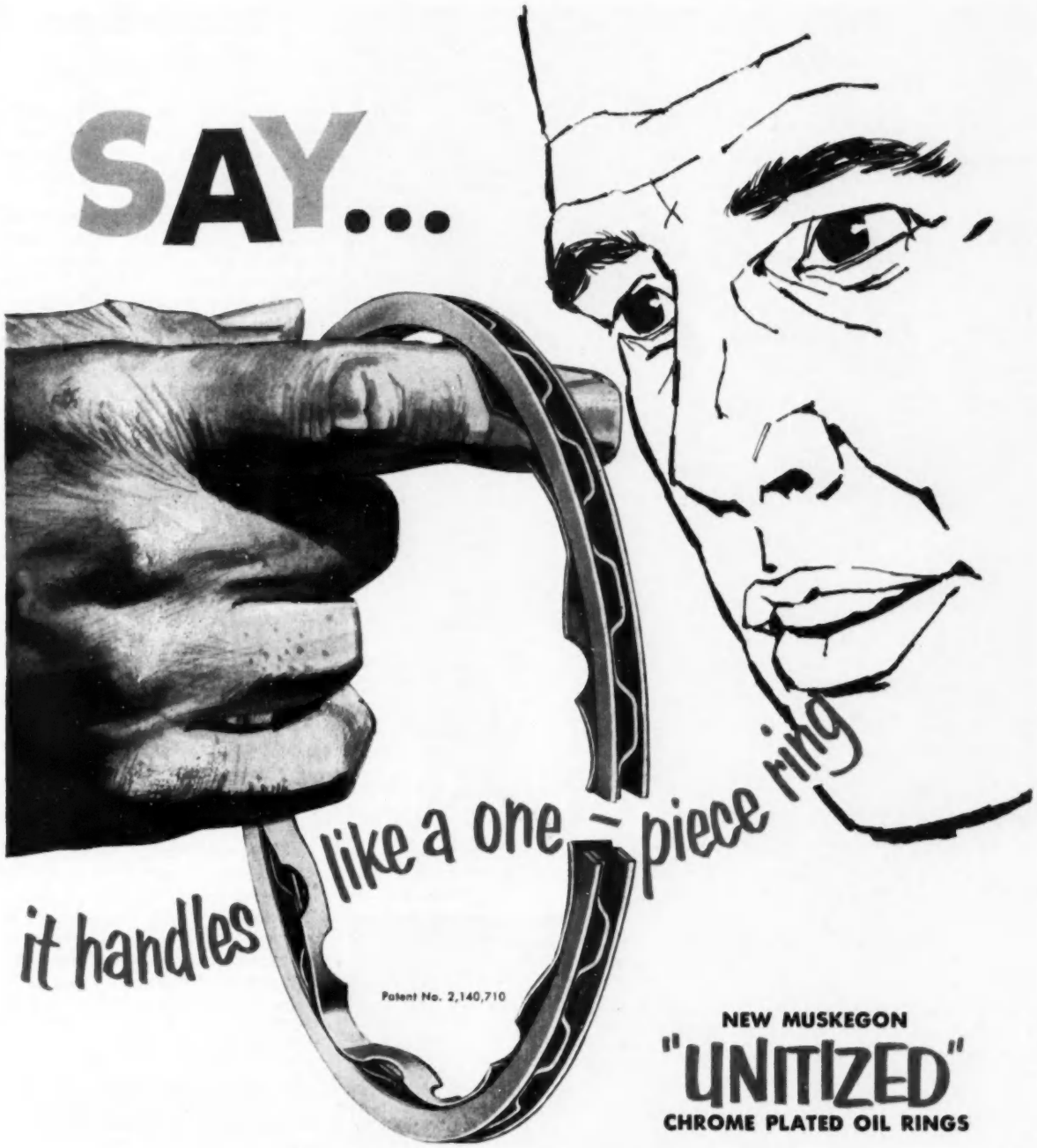

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That's what you'll hear when the assembly-line talk gets around to Muskegon's amazingly different "Unitized" ring . . . the multiple-piece ring that *handles* like a one-piece ring. And no wonder, for look at all the advantages you get. Installation is fast, easy and accurate. There's no fumbling, no chance for error. And when the engine is run, hot oil dissolves the special adhesive—ring components separate and run free.

But there's more to the "Unitized" story. Rails are *chrome plated* to reduce ring and bore wear, scuffing and friction—keep engine performance like-new, oil economy high . . . yet the cost of Muskegon's "Unitized" ring is just *half* that of chrome-plated cast iron oil rings.

Consider Muskegon's CSR-200 rings for your engine. Start by writing for complete facts and figures. Today!

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MUSKEGON Piston Rings

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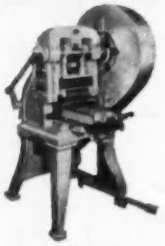
Somewhere in your plant there's an operation, a process, a station recognized as needing definite improvement.

If there is a knotty engineering problem involved you should know there is an organization of experienced talent at Acme Aluminum Alloys who would like to take a crack at solving it.

Consider, for example, what Acme engineers have done in the refrigeration field. An automatic method of charging liquid freon . . . a special compressor performance tester . . . an automatic soldering machine for heat exchanger assemblies . . . a U forming machine for food compartment liners—these are cost reduction solutions to production bottlenecks and excessive costs.

Take another look at the spot marked X in your plant. Then ask Acme engineers to see what can be done about designing and building a specially engineered machine to profitably erase the X.

Engineering and Tool Division



High production ammunition loader

Hydrostatic test stand for rocket heads

Refrigerator compressor performance tester

Acme ALUMINUM ALLOYS, INC.
253 N. FINDLAY STREET, DAYTON 1, OHIO

Oldsmobile Engines

(*Continued from page* 60)

Wheelbase is 122 in. on Super 88 and 88 Series cars, 126 in. for the 98. Overall length is slightly less due to the compactness of the new bumpers. It is 203.3 in. on Super 88 and 88 Series; 212.3 for the 98.

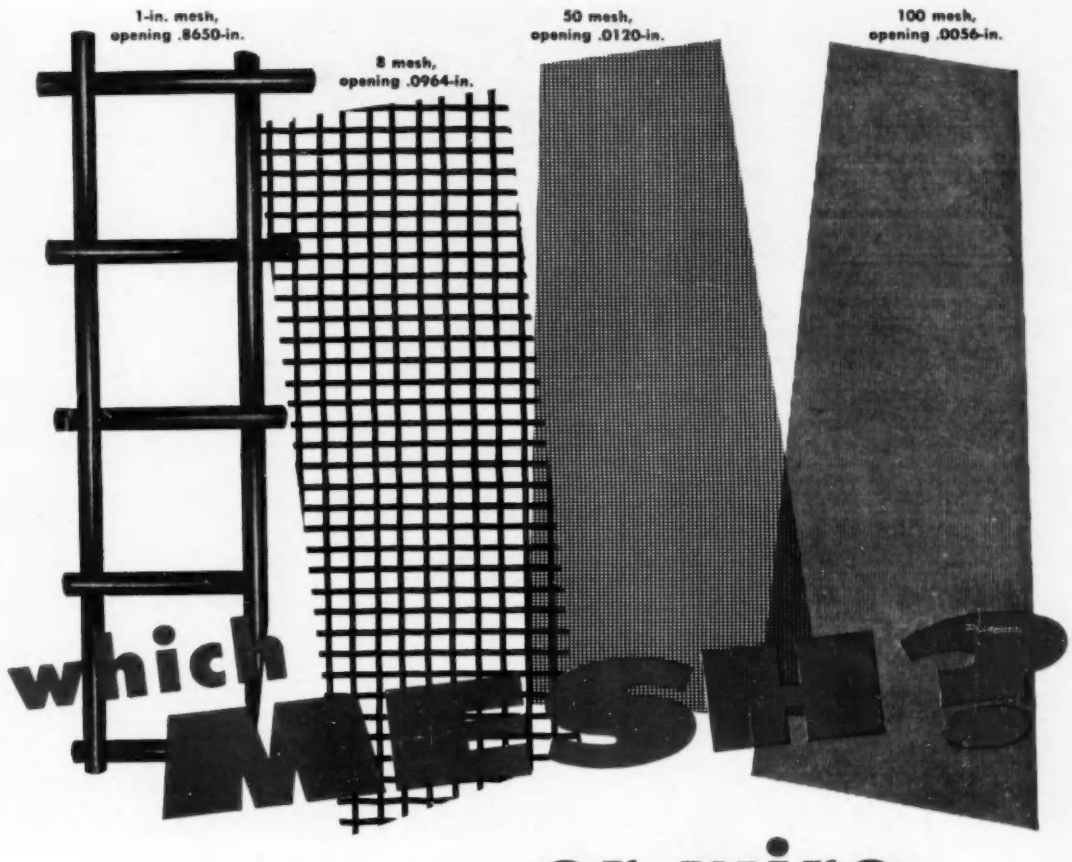
The basic V-8 engine, used on all models, incorporates some notable modifications to improve breathing as well as combustion efficiency. These changes have resulted in an improvement in torque ability at low speeds and have had the added effect of lifting horsepower ratings. Among the engine changes are: a new high lift camshaft with a lift of 0.400 in., probably the highest cam lift in the field this year; modification of the combustion chamber principally to afford better breathing around the valve ports; and increased size of exhaust valve ports in the cylinder head. Other details include: new spark plugs with heavier gage electrodes; full chrome plated top ring; and a new Rochester Products dual carburetor for the Series 88 engine.

The front suspension system has been redesigned to introduce direct-acting shock absorbers housed within the coil springs. This was accompanied by a chain of other mechanical changes such as new upper and lower control arms, and modifications in the chassis frame to provide for additional stiffness at the front. Stabilizer bars too have been redesigned, using heavier bars at the front end.

Although Hydra-Matic drive is basically the same, some changes have been made in valving to produce still smoother shifts.

The power brake cylinder has been improved in action, and simplified in construction, by replacement of the former solenoid valve with a positively acting poppet valve. It is said to be possible now to make five or six power stops with a dead engine.

Some noteworthy improvements have been effected in optional equipment items. Power actuation of windows and seats now is done by means of electric power exclusively. Perhaps the biggest news is that the full air conditioning system now is of the type that is housed entirely under the hood, leaving the luggage compartment clear, thus eliminating the plumbing lines and wiring harness required heretofore. Besides simplifying the installation, the new system is quite unique in providing controls for selecting either recirculated air or completely fresh air.



...or wire
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Mesh is the number of openings per lineal inch, measured from the center of any wire. It is only *one* of many factors to be determined in finding the right industrial wire cloth to fit precisely the job it must do in your product.

Then there's the question of the gauge, metal or alloy, and coating of the wire. The weave, weight, strength, flexibility, resistance to atmospheric and chemical corrosion of the cloth itself. And more.

If it is Reynolds industrial wire cloth it will be *right*—precision processed to your specifications.

Or, if you have wire cloth problems, Reynolds Engineers are ready to help you find the right answer.

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ATHENIA STEEL...*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
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Bundyweld performs faithfully in the hydraulic brake control system of these Caterpillar Diesel No. 112 Motor Graders.

Famed Caterpillar-built products use Bundyweld for vital tubing parts

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Bundyweld starts as a single strip of copper-coated steel. Then it's . . .

continuously rolled twice around laterally into a tube of uniform thickness, and

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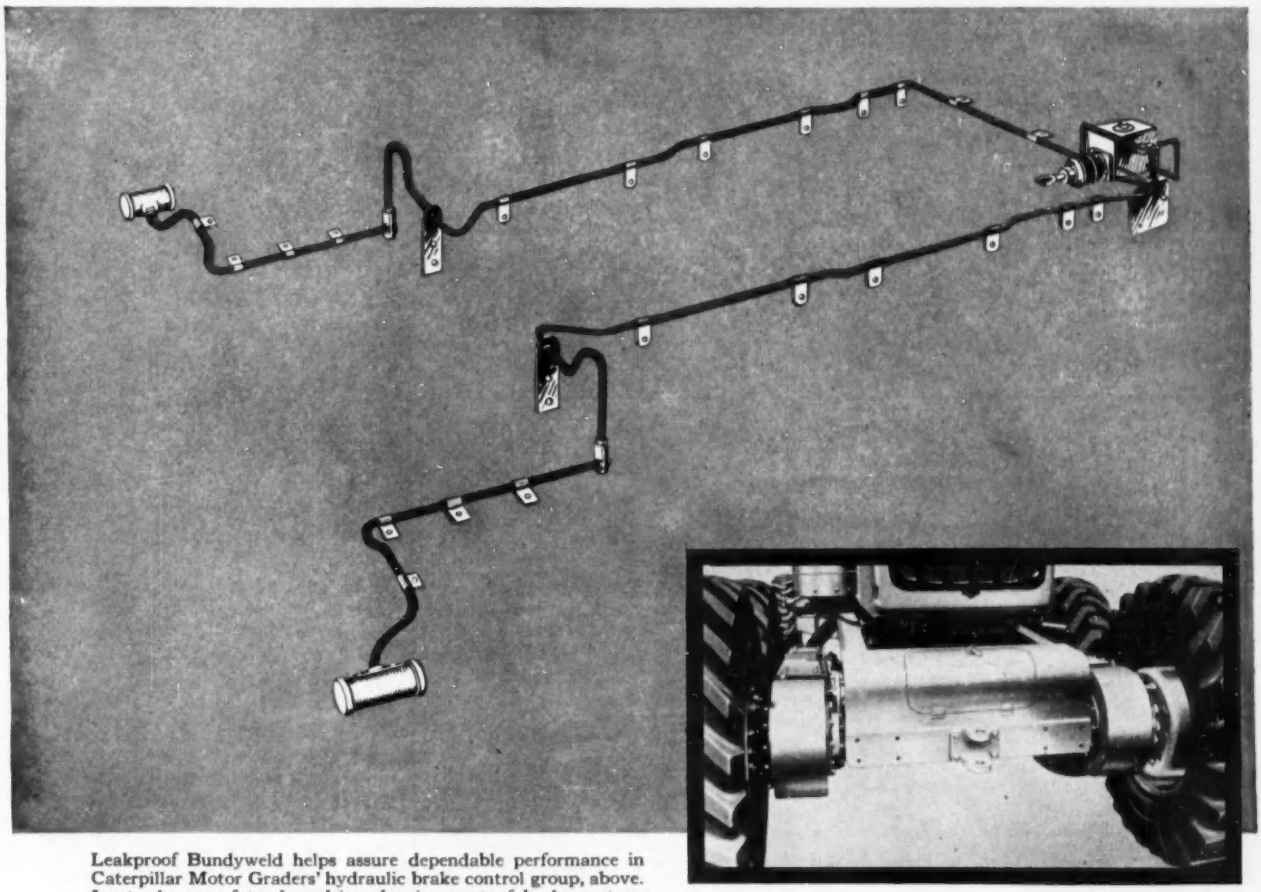
NOTE the exclusive Bundy-developed beveled edges, which afford a smoother joint, absence of bead and less chance for any leakage.



Leakproof Bundyweld helps assure dependable performance in Caterpillar Motor Graders' hydraulic brake control group, above. Inset: closeup of tandem drive showing part of brake system.

On sea and on land, in forests or on farms, on construction projects around the globe – Caterpillar Tractor Co.'s powerful, dependable machines can be found, dynamic symbols of industrial progress.

One significant factor in Caterpillar's dramatic expansion has been the company's insistence on the reliability of its products. ***That's why Caterpillar uses dependable Bundyweld Tubing for oil, brake, gas, transmission, other vital tubing lifelines.***

Here's why you, too, can always put your faith in Bundyweld:

The tubing itself: This quality tubing is double-walled, copper-bonded throughout 360° of wall contact. It's leakproof; thinner walled, yet stronger; takes easily to intricate fabrication operations; takes standard protective coatings; has high bursting strength.

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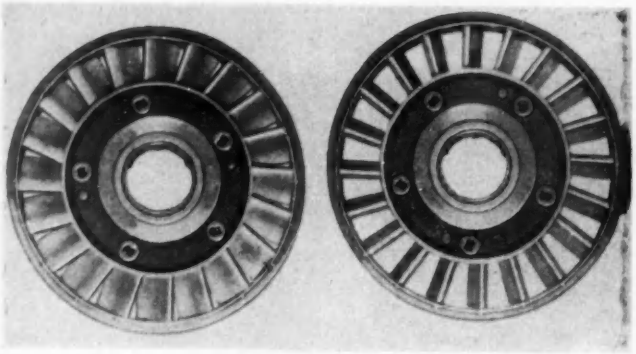
Bundyweld nickel and Monel tubing are sold by distributors of nickel and nickel alloys in principal cities.

Buick Introduces Variable Pitch Dynaflow

(*Continued from page* 51)

being mounted on the valve operating cross shaft.

Generally speaking, the new Dynaflow has essentially the same pump assembly and second turbine, except for modifications to suit the installation of the new stator. However,



Two views of Buick's new variable pitch stator in the 1955 Dynaflow. By pressing the accelerator to the floor, the blades are adjusted to the performance angle shown on the left. The view on the right shows the position of the stator blades during ordinary driving.

other detail changes are evident. The high clutch now is supported on a needle bearing, since the new reaction shaft is larger in diameter and is extended through the reaction flange to serve as the inner race of the needle bearing.

Lubricating oil now enters the high clutch assembly through the rear of the input shaft, cleaning up the former oil channels. The converter pump was modified on early 1954 cars with the addition of 30 bosses cast around the circumference of the flange—15 for pump cover bolts, 15 for balance weight rivets. In addition, the flange has been made thicker, these changes making for increased strength.

Dynaflow controls are completely new to streamline the steering column, the shift indicator being relocated lower on the mast jacket. Pivot point of the shift lever is between the handle and control lever shaft, the shaft moving downward to release the handle from the stops. Since the stop plate is welded to the mast jacket, no angular adjustment is required with the new detent location. Synchromesh controls are quite similar, many parts being interchangeable.

Throttle linkage has been revised to suit the new Dynaflow control. The main part of pedal travel operates the throttle valve, while only about the last half-inch of travel operates the stator piston control valve. Linkage consists of an angular equalizer shaft with one arm extending to the accelerator pad and one arm to the throttle operating rod. In low range and reverse, throttle linkage has no effect on stator vane position since there is no pressure at the high ac-

(*Turn to page* 124, *please*)

Designed and engineered to meet specific requirements as to shape, size, mechanical strength and operation at high voltage under extreme temperature conditions.
Frenchtown PORCELAIN COMPANY
81 MUIRHEAD AVE. . . . . TRENTON 9, N.J.

THIRSTY
THROATS
A jet engine, operating at extreme speed and altitude, is a thirsty throat rapidly consuming large quantities of fuel and air. *Everything* depends on keeping this throat fed . . . and this demands a Main Fuel Pump that will deliver *without fail!* Designing, developing and producing these pumps — and other vital fuel control systems — "CECO" is helping America achieve mastery in the air. Our complete and fully integrated engineering-production team is available to help you.
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cumulator and the vanes remain in high angle position.

The steering pump now has a lightweight steel reservoir with a magnesium cover. Pressure relief valve setting has been increased to 875-1025 psi.

The optional power brake cylinder is entirely new, of air-suspended type. One of its unique features is the separation of the power brake piston on brake applications without vacuum assist. Under normal conditions the entire piston moves in the housing when brakes are applied. In case of engine stall, however, the inner section, of smaller diameter, is all that moves, thus making it possible to reduce power piston return spring pressure from the former 20-lb to one 6-lb spring on the small diameter piston, thereby reducing pedal pressure by 14 lb. This decrease in spring load, coupled with an increase of pedal ratio from the former 1 to 1, to 1.5 to 1 has made it possible to eliminate the vacuum pump required formerly.

The vacuum reserve tank system includes a check valve installed in the vacuum line between the intake manifold and power cylinder, the reserve tank capacity of about 180-cu in. being sufficient to make two or three normal power brake applications in case of engine stall. When all vacuum has been exhausted, brakes can be operated manually with very little effort.

The hypoid semi-floating type rear axle is continued on all series, Series 40 and 60 having a tread of 59-in., while the 50 and 70 have a tread of 62.2 in. Torque tube drive is continued without change.

Nineteen fifty-five axle ratios are as follows:

Series	*Synchromesh*	*Dynaflow*
40	3.9	3.6
50	3.9	3.4
60	3.9	3.4
70	—	3.4

A number of accessory features deserve special attention. Electrically operated, horizontally and vertically adjustable front seats, similar to those offered on Series 50 and 70, now are available on all models. They are actuated by two motors—one for vertical, the other for horizontal adjustment.

Four electrically-operated window lifts are standard equipment on Models 66C, 56C, 76C, and 76R, available as optional for all series except Model 48.

An improved air conditioning system is made available as optional equipment on all models except convertibles, estate wagons, and Series 48. Its basic design is the same as last year but the compressor and condenser are new. The compressor is of axial piston type with pistons operating parallel to the crankshaft from a wobble plate. The condenser has been redesigned to improve cooling at low speed and idle.

"The CAN in CAN DO!"

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Licks These Problems:

- Lubrication at extreme temperature and pressure ranges.
- Lubrication of bearings adjacent to surfaces that cannot be contaminated.
- Lubrication of mechanisms operating intermittently over long periods.
- Lubrication of parts where dust collection presents a problem.
- Lubrication of parts where environment affects organic lubricants.
- Lubrication of inaccessible bearings.

1. Bearing can be placed where conventional lubrication would not be feasible.

2. Mechanical and electronic controls for automatic operations can be placed *without concern for water, steam, chemical actions and temperatures.*

3. Lubrication of extraneous operating mechanisms is considerably simplified.

SURF-KOTE bonded lubricants are easy to apply . . . to a variety of metallic surfaces including: ferrous alloys, stainless steels, aluminum, brass, bronze magnesium, titanium, cadmium and zinc. They are thinned by solvent, applied by spraying, dipping or brushing, then dried and baked, requiring only the equipment generally available in paint and enamel departments.

Parts may be processed in your own plant or by us, as you prefer.

If you would like a copy of the SURF-KOTE illustrated folder, and the SURF-KOTE Surface Preparation and Application Specification Sheets, drop us a line today.

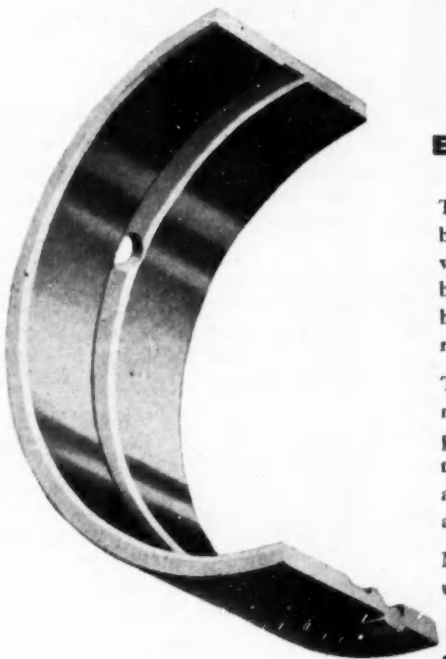
HOHMAN PLATING & MFG., INC.
905 East Third Street • Dayton 2, Ohio

BOOKS . . .

ALTERNATING-CURRENT MACHINES, *by A. F. Puchstein, T. C. Lloyd and A. G. Conrad, published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Price, $8.50.* Beginning with transformers, this widely useful book shows clearly how to understand, test, predict, and calculate the behavior and performance of the most important classes of alternating current power machinery. The theories of the operation of these machines stand as excellent media for the development of engineering disciplines. This third edition offers an unusually complete treatment of machine reactions based on modern practice. Although rigorous in the treatment of machine reactions, the book is equipped with expressive, self-identifying terms, notations, and symbols. A diverse set of up-to-date problems has been incorporated to test understanding of the theoretical applications.

EXTRA STRENGTH WITHOUT EXTRA LENGTH

moraine-400



IS THE TOUGHEST AUTOMOTIVE ENGINE BEARING EVER DEVELOPED

The extraordinary toughness of Moraine-400 permits the use of shorter bearings . . . permits automotive engineers to step up engine horsepower without increasing engine size. Crankshafts can be *strengthened* without being *lengthened*—still carry greater piston loads! Space gained between bearings can be utilized for heavying-up crankarms. In short, with Moraine-400, bearing *length* ceases to be a limiting factor in engine design.

The extreme toughness of the Moraine-400 is due to a new bearing metal, developed by General Motors-Moraine research over a ten-year period. This aluminum-base alloy, bonded to a steel back, has amazing toughness. Moraine-400 bearings operate satisfactorily on oil-hardened and Tocco-hardened shafts, and are outstandingly good in such qualities as embedability, conformability, and resistance to corrosion.

Note: Moraine also makes the famous Moraine-100 bearings—now used as original equipment on many of the nation's finest cars and trucks.

m

moraine products

DIVISION OF GENERAL MOTORS CORPORATION, DAYTON, OHIO

GOODYEAR AIRCRAFT

ALUMINUM COMPONENTS

are **Alodized**

WITH "ALODINE"®

for **EXTRA PROTECTION**

Many aluminum parts of military aircraft are treated by Goodyear Aircraft Corporation with Dip "Alodine" to meet the requirements of Military Specification MIL-C-5541. Alodized aluminum is notable for its high corrosion resistance and exceptional paint bonding.

"Alodine" can also be used to protect aircraft in service.

If it's aluminum, be sure it's Alodized.

Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT COMPANY

AMBLER, PA.

DETROIT, MICH. NILES, CALIF. WINDSOR, ONT.

SHORTIES

Twenty-six States have reported the results of 557 speed studies conducted during 1953 on main rural highways. The results of these studies, which included observations of 241,089 vehicles, show that: the average speed of all vehicles in 1953 was 49.7 mph; the average speeds for passenger cars, trucks, and buses were 51.1, 44.9 and 51.5 mph, respectively.

•

In 1850, the U. S. had about one-sixth of a horsepower per person; today there are two and two-thirds horsepower at work for each person.

•

For every 100 people in the world, only six are inside the borders of the U. S. A.; yet this nation produces 40 per cent of the world's goods.

•

A major aircraft manufacturer purchases some 50,000 tons of materials each year.

•

The engine and nacelle on a single modern airplane weigh more than 16 times as much as the first aircraft flown by the Wright brothers in 1903.

•

A new process of "precision investment" casting has cut manufacturing time on one guided missile part from 750 hours to about eight hours.

•

The blast of the hydrogen device at Eniwetok ripped the floor of the Pacific Ocean and laid open a wound in the earth's surface 175 ft deep and a mile in diameter. The entire downtown section of Chicago would fit into this man-made crater.

•

One 600 mph bomber could drop bombs on New York, Philadelphia, Baltimore and Washington, D. C., in a total period of 22 minutes.

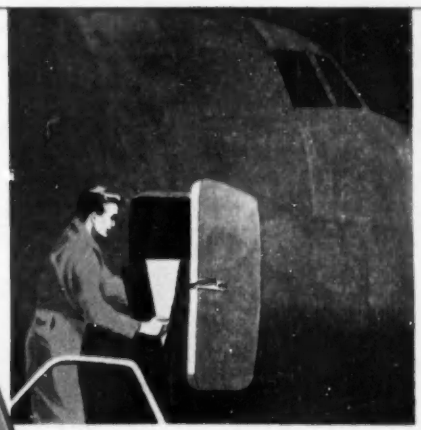
Harvey Aluminum will reduce your costs

HERE'S HOW *one manufacturer*

CUT COSTS 62%

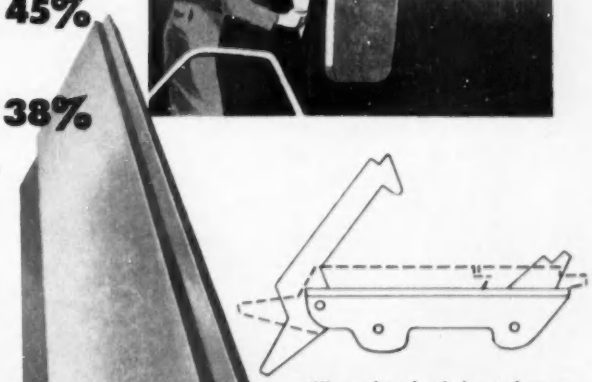
CUT MACHINING OPERATIONS 45%

INCREASED PRODUCTION 38%



Working closely with the engineers of an aircraft component manufacturer,* Harvey engineers designed a flush-mounted safety lock for external aircraft access doors. By using aluminum extrusions rather than machining the bolt and trigger from bar stock, production costs were reduced by 62%. The use of extrusions virtually eliminated the costly machining operation and at the same time stepped up the unit rate of production approximately 38%. If you use structural metal in your business, Harvey Aluminum extrusions will help reduce your costs. We hope you'll get in touch with a Harvey Field Engineer without delay.

**Name on request*



The safety latch is made up from the cross section of two aluminum extrusions. Harvey engineers bypassed machining, casting and forging to cut the client's costs.

The men at Harvey are dedicated to the idea of improving your product while reducing your costs. And remember, Harvey prepays the freight to your plant.

MAKING THE MOST OF ALUMINUM . . . FOR EVERYONE

HARVEY Aluminum

An independent facility producing special extrusions, press forgings, bar stock, forging stock, tubing, impact extrusions, aluminum screw machine products, and related mill products.

HARVEY ALUMINUM SALES, INC.
TORRANCE—LOS ANGELES, CALIFORNIA
BRANCH OFFICES IN PRINCIPAL CITIES

Man,

Detail View of New
Spicer Center Bearing Mounting

PATENT PENDING

50 YEARS OF
Spicer
SERVICE

DANA CORPORATION

what a relief!

Revolutionary New Spicer Center Bearing Mounting for Spicer Propeller Shafts

REDUCES VIBRATION UP TO 80%
LENGTHENS TRUCK AND PARTS LIFE
LESSENS DRIVING FATIGUE

Happy days ahead, for many drivers of 1955 trucks!

The new Spicer Center Bearing Mounting has put the shackles on destructive, annoying propeller shaft vibration ordinarily transmitted through center bearing supports!

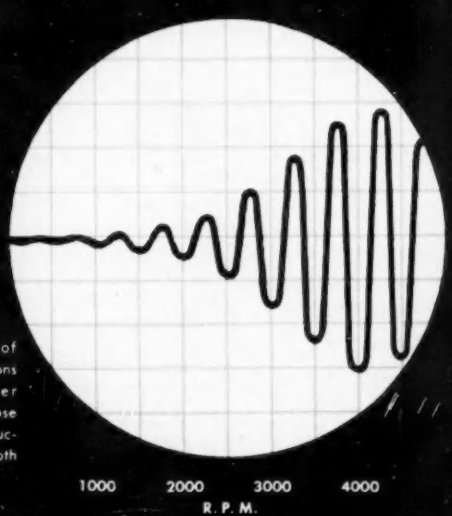
Gone is the propeller shaft hum . . . the buzz . . . the penetrating, nerve-wracking oscillations that weary the driver's body and wrack the truck's frame.

The Spicer Center Bearing Mounting embodies a revolutionary combination of ball bearing and low-frequency rubber. This achieves remarkably low vibration transmissibility at driving speeds. It dampens . . . deadens . . . absorbs nearly all the vibration disturbances transmitted to it from the drive line.

The new Spicer mounting is an outstanding engineering advancement. It is as momentous and far-reaching in effect as the now-famous soft-rubber engine mounting principle. One ride in a truck equipped with this Spicer unit will quickly prove its driver-saving, truck-saving ability.

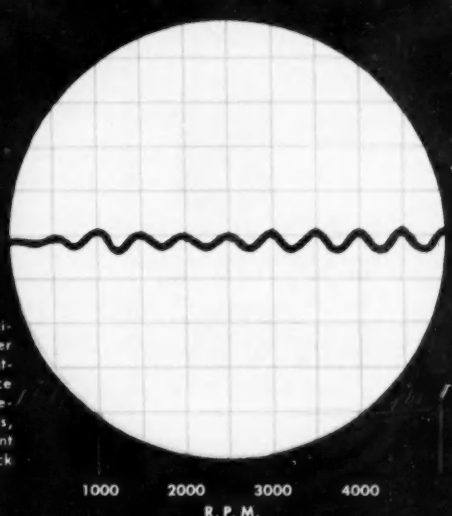
The new Spicer Center Bearing Mounting is available for original truck equipment, as an integral part of the Spicer Propeller Shaft assembly. It is another Spicer engineering "first," typical of Spicer pioneering that has been dedicated to the advancement of the automotive industry.

Oscillograph Recording of Standard Center Bearing Mounting



Extreme variation of amplitude of vibrations in standard center bearing mounting cause excessive and destructive vibration to both truck and driver.

Oscillograph Recording of New Spicer Center Bearing Mounting



Small modulus of vibration in new Spicer Center Bearing Mounting indicates absence of annoying, trouble-making frequencies, assuring more pleasant and profitable truck operation.

TOLEDO 1, OHIO

SPICER PRODUCTS: TRANSMISSIONS • UNIVERSAL JOINTS • PROPELLER SHAFTS • AXLES • TORQUE CONVERTERS • GEAR BOXES • POWER TAKE-OFFS • POWER TAKE-OFF JOINTS • RAIL CAR DRIVES • RAILWAY GENERATOR DRIVES • STAMPINGS • SPICER and AUBURN CLUTCHES • PARISH FRAMES

Forecast for '54 Motor Vehicle Registrations

(*Continued from page 63*)

available date along with an estimate for the remaining period of the year were provided by each of the registration bureaus that cooperated with us. It is believed, judging from past experience, that this estimate of total motor vehicle registrations will be within less than one per cent of the final figures when they are published in the 1955 Statistical Issue of AUTOMOTIVE INDUSTRIES.

Passenger car registrations will number 47,985,594 as against 46,251,460 in 1953, an increase of 3.7 per cent. Trucks and buses combined will account for 9,618,078 registrations as compared with 9,343,274, a gain of 2.9 per cent. Total registrations in 1954 will show an increase of 3.6 per cent over the vehicles registered during 1953.

California will lead the country in total vehicles registered, followed by New York in second position and Pennsylvania, Texas and Ohio in third, fourth and fifth positions in the order named. Twenty states will have over one million vehicle registrations. Indications at present are that Nebraska and the District of Columbia will show a decrease, but that trend could easily be reversed when final figures are available.

Geographical gains were the greatest in the East South Central states with 4.8 per cent, while the New England and South Atlantic states tied for second position with increases of 4.6 per cent over those same areas in 1954. The West North Central states indicate the least increase of only 2.4 per cent, but these states are followed closely by the Middle Atlantic states of New Jersey, New York and Pennsylvania with only 2.5 per cent. The percentage increase for the Mountain states is the same as the national average of 3.6 per cent. The remaining areas can be seen in the accompanying table.

MOTOR VEHICLE REGISTRATIONS BY REGIONS

Region	1954	1953	Gain (%)
New England	3,223,430	3,081,960	4.6
Middle Atlantic	9,671,358	9,431,901	2.5
East North Central	12,191,550	11,732,579	3.9
West North Central	6,057,596	5,915,758	2.4
South Atlantic	7,307,057	6,984,961	4.6
East South Central	3,409,412	3,254,395	4.8
West South Central	5,788,015	5,565,118	4.0
Mountain	2,512,581	2,425,613	3.6
Pacific	7,442,673	7,202,449	3.3
Total	57,603,672	55,594,734	3.6

Specialized Service

IN AUTOMOTIVE PROTECTION AND SAFETY

United Specialties Company produces a variety of steel-processed products for the automotive and other industries that contribute materially to improved performance, economy and satisfaction.

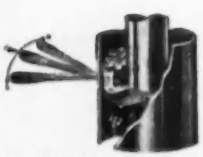
Combination Oil Bath Air Cleaner and Silencer for use on down-draft carburetors.

Plastic pre-cleaner is easily attached — has a transparent dust chamber — reduces air cleaner servicing frequency — saves oil — fits practically any center tube air cleaner.

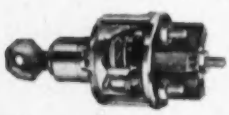
UNITED AIR CLEANER DIVISION

Oil Bath Air Cleaners — United manufactures a complete line of oil bath air cleaners for protection of engines in trucks, busses, tractors, cars, stationary or portable power units — a range of models to fit every type of internal combustion engine including diesels. United has designed and built almost 20 million air cleaner units.

Our sales engineers will give prompt attention to your inquiries.



Concealed type, six-wire turn signal switch. Uses regular front and rear park or stop lights. Signal is self-cancelling.



Conventional type ignition switch used on popular makes of cars and trucks.

MITCHELL DIVISION

Semi-Automatic, Self-Cancelling Turn Signal Switch built by Mitchell is standard equipment on many cars and trucks.

Mitchell Ignition Switch has an industry-wide reputation for dependability and extra long life. "Radio" position reduces battery drain with motor off.

Rolled Shapes, stampings and dovetails are offered by Mitchell in a complete range of metals, gauges and designs.

UNITED SPECIALTIES COMPANY

UNITED AIR CLEANER DIVISION — CHICAGO 28

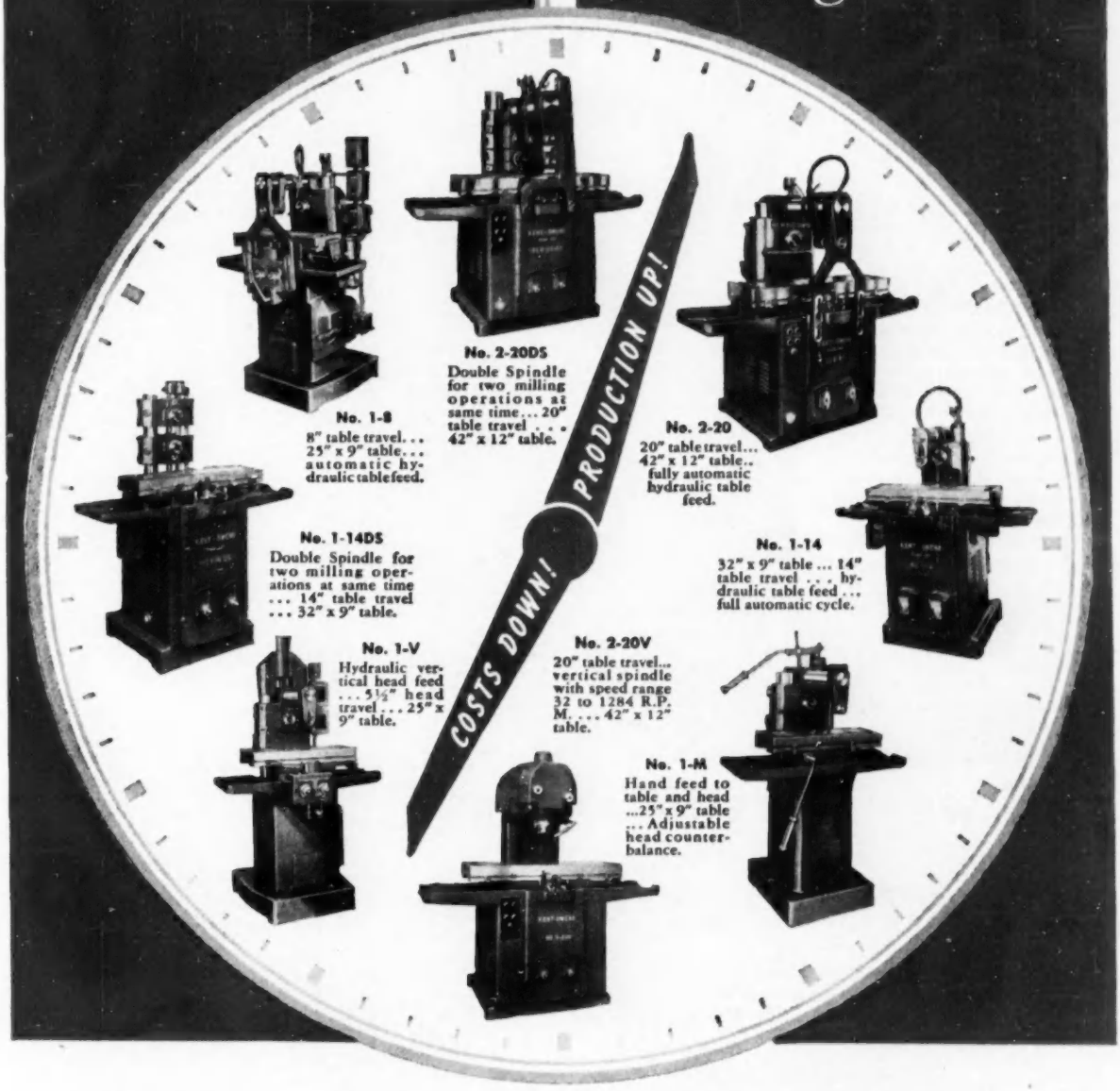
MITCHELL DIVISION — PHILADELPHIA 36 • BIRMINGHAM 11, ALABAMA

AUTOMOTIVE INDUSTRIES . . .

Is your News Magazine of Automotive and Aviation

MANUFACTURING

Time to *Reduce* Milling Costs!


COSTS DOWN!
PRODUCTION UP!
No. 2-20DS
Double Spindle for two milling operations at same time... 20" table travel . . . 42" x 12" table.
No. 1-8
8" table travel... 25" x 9" table... automatic hydraulic table feed.
No. 2-20
20" table travel... 42" x 12" table... fully automatic hydraulic table feed.
No. 1-14DS
Double Spindle for two milling operations at same time ... 14" table travel ... 32" x 9" table.
No. 1-14
32" x 9" table ... 14" table travel . . . hydraulic table feed ... full automatic cycle.
No. 1-V
Hydraulic vertical head feed ... 5½" head travel ... 25" x 9" table.
No. 2-20V
20" table travel... vertical spindle with speed range 32 to 1284 R.P.M. ... 42" x 12" table.
No. 1-M
Hand feed to table and head ...25" x 9" table ... Adjustable head counterbalance.

KENT-OWENS REPRESENTATIVES

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General Machinery Corp.

BUFFALO
Don W. Patterson

CHICAGO
Four States Mach'y Company

DALLAS
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Ottis Machinery Co.

GRAND RAPIDS
Joseph Monahan

HAMILTON, ONT.
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HARTFORD
Harrington Machinery, Inc.

HOUSTON
Oliver H. Von Horn Co., Inc.

INDIANAPOLIS
Ottis Machinery Co.

KANSAS CITY
Eichman Machinery Co.

LOS ANGELES
Germain Mach'y Co.

MILWAUKEE
Four States Mach'y Company

MINNEAPOLIS
The Satterlee Company

MOLINE
John J. Normoyle Co.

MONTREAL
F. F. Barber Mach'y Co.

NEW ORLEANS
Oliver H. Von Horn Co., Inc.

NEW YORK
Harrington-Wilson-Brown Company

PHILADELPHIA
Calco Machinery Company

PITTSBURGH
Burney Machinery Company

ROCHESTER
R. W. Schieber Machinery Co.

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SYRACUSE
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TORONTO, ONT.
F. F. Barber Mach'y Company

WINDSOR, ONT.
F. F. Barber Mach'y Company

Kent-Owens machines assure you of speed with accuracy... and cut your milling costs! Designed with advanced features . . . performance-proved for meeting tough schedules in production milling. Rugged . . . simple . . . versatile. Twin-post head mounting assures balanced load. Greater cutting efficiency—only two gear contacts, motor to cutter. Write for bulletins on wide range of hydraulic and hand-operated machines. Also, let Kent-Owens design and build your tooling and special machines. Kent-Owens Machine Co., Toledo, Ohio.

Call on

KENT-OWENS

for Milling Machines

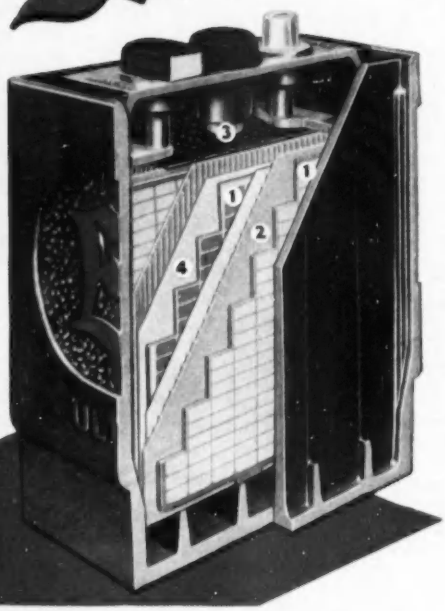
LOOK INSIDE Exide

1 POWERFUL, LONG-LASTING PLATES—Maximum power and dependability—in all types of driving, thanks to patented SILVIUM grid alloy and super G.O.X. oxides.

2 LONG-LASTING SEPARATORS—Practically indestructible—resist heat and vibration—prevent dead cells—thanks to Exide's exclusive PORMAX.

3 DUAL-PURPOSE LEVELEX—Longer life in hot weather—more power in cold weather—thanks to Exide's two-level control of electrolyte.

4 POWER-SAVING RETAINERS—Power is retained in plates—battery life is extended—thanks to Exide VITREX mats.



AND THERE'S A LOT YOU CAN'T SEE—But it's there! It's Exide's engineering and manufacturing "know-how"—66 years of it—your guarantee of satisfaction.

SEE WHY EXIDE ULTRA START with Silvium and Levelex IS YOUR BEST BATTERY BUY

No matter how you look at the new Exide Ultra Start® it's the right battery for you . . . whether you build cars, trucks, buses or off-the-highway equipment. It's the greatest battery in Exide's 66 year history.

ULTRA START Batteries, with the new dual-purpose Levelex for seasonal control of electrolyte level, deliver increased power in cold weather . . . meet heavier starting loads. In hot weather they withstand high under-hood temperatures. Their corrosion-fighting grid alloy, Silvium®, resists overcharge, assuring longer, "healthier" battery life!

No matter how exacting your battery requirements, you can always count on Exide. 13 plants throughout the nation assure prompt service and factory-fresh batteries, for gas or diesel applications.

Exide AUTOMOTIVE DIVISION
THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 20, Pa.
Exide Batteries of Canada, Limited, Toronto

Exide BATTERIES

CALENDAR

OF COMING SHOWS AND MEETINGS

Pan-American Road Race, Mexico, Nov. 19-23

ASME, annual meeting, Statler Hotel, New York, N. Y..Nov. 29-Dec. 3

First International Automation Exposition, 242nd Coast Artillery Armory, New York, N. Y., Nov. 29-Dec. 3

First Annual Auto Trim Trade Show, Hotel McAlpin, New York, N. Y. .....Dec. 5-7

National Standard Parts Association, annual convention, Sherman Hotel, Chicago, Ill. ....Dec. 6-7

Society of the Plastics Industry, fifth Film, Sheeting, and Coated Fabrics Div. conference, Hotel Commodore, New York, N. Y..Dec. 7-8

Automotive Service Industries Show, Navy Pier, Chicago, Ill. ...Dec. 8-10

1955

Chicago Automobile Show, Chicago, Ill. .....Jan. 8-16

SAE Golden Anniversary Annual Meeting and Engineering Display, Sheraton - Cadillac and Statler Hotels, Detroit, Mich., Jan. 10-14

Forty-Fifth Annual National Motor Boat Show, Kingsbridge Armory, New York, N. Y. .....Jan. 14-23

Plant Maintenance & Engineering Show, International Amphitheatre, Chicago, Ill. .....Jan. 24-27

National Automobile Dealers Association, annual convention, Conrad Hilton Hotel, Chicago, Ill., Jan. 29-Feb. 2

Detroit Automobile Show, Detroit, Mich. .....Jan. 29-Feb. 6

Automotive Accessories Manufacturers of America, annual exposition, Navy Pier, Chicago, Ill. .....Feb. 7-11

Society of the Plastics Industry, 10th annual Reinforced Plastics Div. conference, Hotel Statler, Los Angeles, Calif. .....Feb. 8-10

Universal Travel & Auto Sports Show, Madison Square Garden, New York, N. Y. .....Feb. 20-27

Society of the Plastics Industry of Canada, 13th annual conference, Hotel London, London, Ont., Feb. 22-23

Pacific Automotive Show, Pan-Pacific Auditorium, Los Angeles, Calif. .....Feb. 24-27

SAE Golden Anniversary Passenger Car, Body, and Materials Meeting, Sheraton-Cadillac Hotel, Detroit, Mich. .....March 1-3

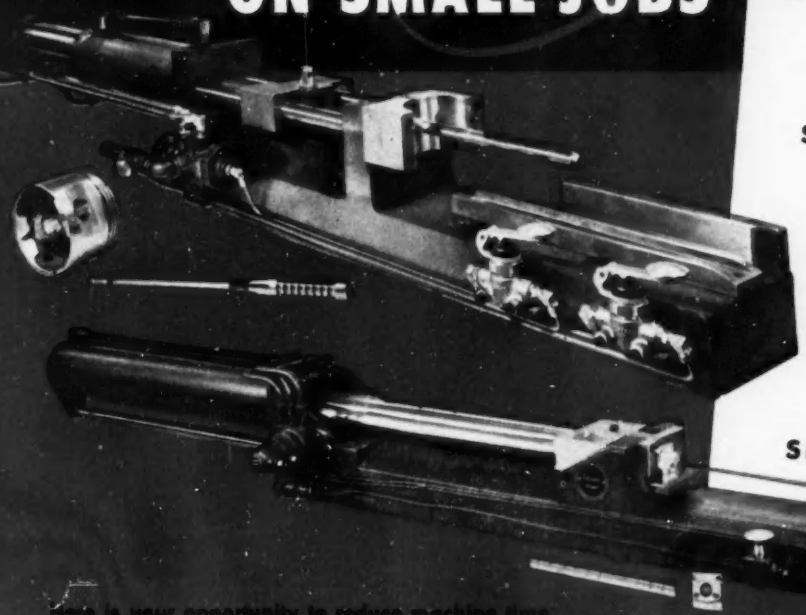
National Association of Corrosion Engineers, 11th annual conference and exhibition, Palmer House, Chicago, Ill. .....March 7-11

SAE Golden Anniversary Production Meeting and Forum, Netherland Plaza Hotel, Cincinnati, O. .....March 14-16

ASTE Western Industrial Exposition, Shrine Auditorium and Exposition Hall, Los Angeles, Calif. .....March 14-18

Ninth Western Metal Congress and Exposition, Pan-Pacific Auditorium, Los Angeles, Calif., March 28-April 1

Reduce Broaching Costs
ON SMALL JOBS



OIL GROOVES
•
SMALL SPLINES
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SERRATIONS
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KEYWAYS
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SLOTTING
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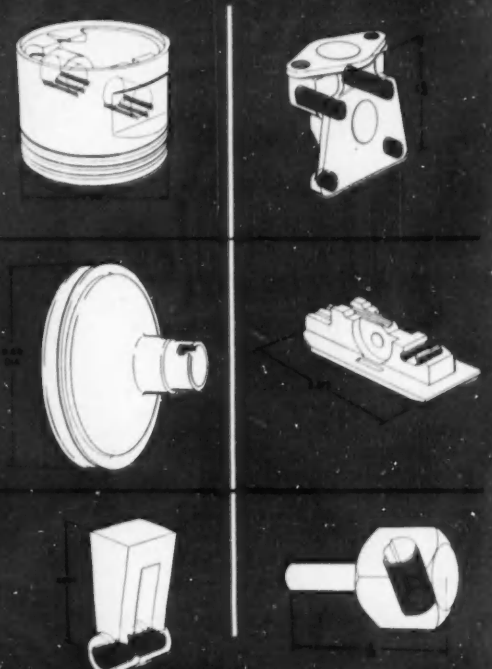
BURRING
•
SIZING HOLES

Here is your opportunity to reduce machine time and cut production costs on these small broaching jobs. And you avoid tying up your regular broaching machines which are built for heavier work.

The Red Ring Self-contained Broaching Fixture is a compact, portable, push-type unit. Specifically designed for a particular job, it has all the elements (automatic and manual) of any well designed fixture. A pneumatic cylinder is added to pull or push the broach. Just connect it with the air supply and you are ready to start broaching.

These Red Ring fixtures are used on a wide range of small jobs requiring a "Pull" not to exceed 2000 lbs. and a stroke of 25" or less. Here they are highly effective and very economical.

Investigate—talk with a Red Ring Engineer or write for Bulletin BS4-9.



SPUR AND HELICAL
GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING
AND ELLIPTOID TOOTH FORM

NATIONAL BROACH AND MACHINE CO.

5600 ST. JEAN . . . . . DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

FORD TRUCKS for '55

(*Continued from page* 58)

is almost as wide as the cab, provide full range vision.

Tubeless tires are standard on the Courier and Series F-100 models. And a new school bus chassis with a 220-in. wheelbase is available in the B-600 Series for a 55 passenger bus body.

Champion 18 mm spark plugs are used in the engines.

CONDENSED SPECIFICATIONS OF 1955 FORD TRUCK ENGINES

Engine	Displ.	Horsepower	Torque	Bore	Stroke	Comp.
Cost Clipper Six	223 cu in.	*118@3800 rpm	195@1200-2400 rpm	3.62	3.60	7.5
Power King V-8	239 cu in.	132@4200 rpm	215@1800-2200 rpm	3.50	3.10	7.5
Power King V-8	256 cu in.	140@3900 rpm	228@1900-2400 rpm	3.62	3.10	7.5
Cargo King V-8	279 cu in.	152@3800 rpm	246@1800-2400 rpm	3.56	3.50	7.2
Cargo King V-8	317 cu in.	170@3900 rpm	286@1700-2300 rpm	3.80	3.50	7.2

* 116 hp, 194 lb-ft torque on P-Series Parcel Delivery chassis.

Advances for increased engine life, featured in the Cargo King V-8's, include: New stress-relieved cylinder heads which resist warping; stronger valve operating linkage with stiffer rocker arm supports; phosphate-coated rocker arms and tubular-design valve push rods; new cobalt-chrome faced exhaust valve seat inserts; new dished-type intake valve heads; improved water pump design for stronger fan support; new rib-reinforced autothermic pistons; more durable crankshaft with relocated oil holes to provide oil cushions for connecting rod bearings at greatest moment of stress.

In three of the truck engines, horsepower and torque ratings have advanced without any increase in piston displacements. They are the 223 cu in. six-cyl and 239 and 256 cu in. V-8's. Compression ratio was increased from 7.2:1 to 7.5:1 on these engines.

Aircraft Production at DeHaviland Plant

(*Continued from page* 72)

When building the new plant, a model with every tool and workbench to scale was made of the entire setup. By this means it was possible to obtain the best arrangements for working space in the plant and also to speed the moving job when the factory moved from the old to the new home.

In the overhaul section of the factory there are always a number of U. S. Air Force L-20 aircraft undergoing repairs. A large number of these single-engined aircraft are in use by the USAF for reconnaissance and ambulance operations.

YA Radiators
...do double duty on portable air compressors
As the picture shows, YA Radiators do time on the rock pile, too! As standard equipment on many of America's most rugged portable air compressors, these Yates-American Radiators and Intercoolers fill the important job of cooling both the hard-working engines and the air they compress. Yates-American builds quality radiators for motor trucks, industrial trucks, tractors, locomotives, power plants—offers products for every heat transfer use. Give us your requirement . . . we'll show you how we can help you.
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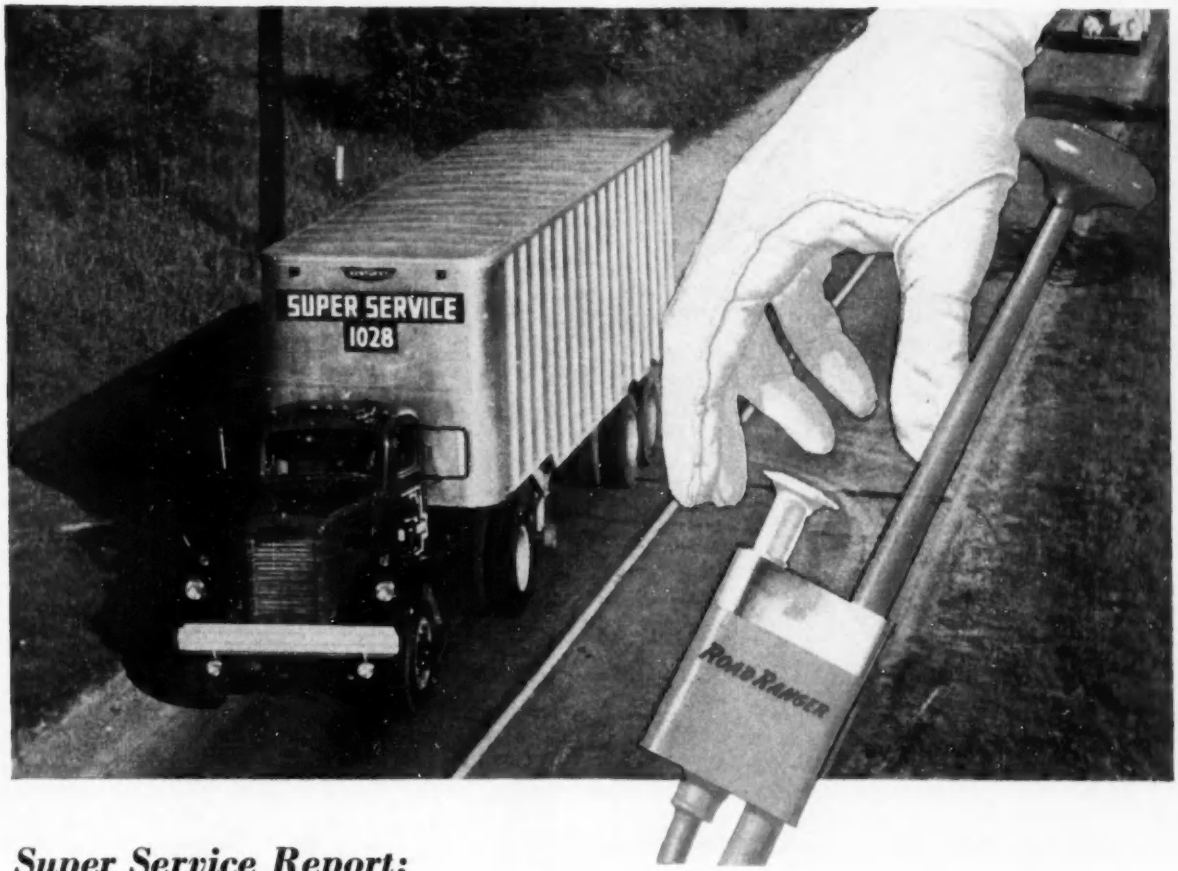
AUTOMOTIVE INDUSTRIES
Keeps You Informed



Super Service Report:

ROADRANGER® is Tops!

Super Service Motor Freight of Nashville, Tennessee, *specified* a *new* tractor... and got it! The new ROAD-RANGER-equipped White WC-24-TD tractor is setting performance records. Here's what the "Big Three" of Super Service report on their R-95-C ROAD-RANGERS:

R. M. Crichton

Owner, R. M. Crichton, "Completely satisfied. With the 10 evenly-spaced forward speeds we're taking hills at 35 mph when 15 mph was good before . . . cutting one hour off our 10-hour run."

Ray Carter

Maintenance Supt., Ray Carter, "Best transmission we ever had. We expect longer engine life due to consistently higher engine rpm."

Driver Supt., Walter Haynes, "Our drivers are always bragging about higher road speeds and easier shifting."

This 10-speed, one-stick ROADRANGER is also offered with an overdrive gear in tenth and has been setting performance records in many other fleets. Shifting through the 8-speed, one-stick, Model R-45 ROADRANGER, trucks in the 125-160 hp range are giving operators faster round trips . . . less maintenance expense. From the more than 110 different models, *leading truck manufacturers standardize on Fuller* Transmissions. *Specify* a Fuller Transmission in *your equipment.*

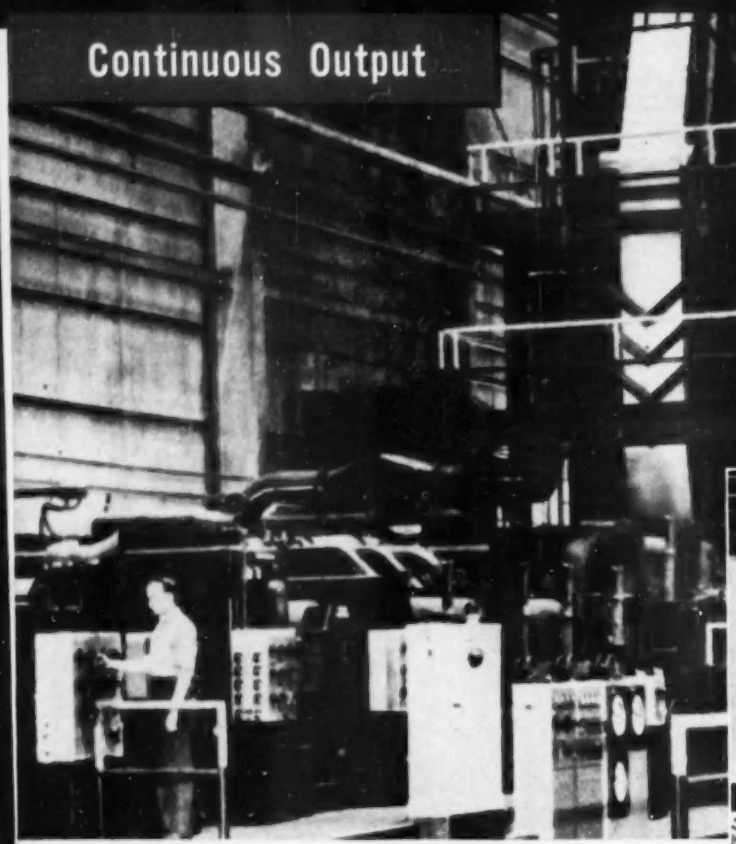
Walter Haynes

Fuller TRANSMISSIONS

FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO, MICHIGAN

Unit Drop Forge Division, Milwaukee 1, Wisc. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Western Dist. Branch (Sales & Service, All Products), 641 E. 10th St., Oakland 6, Cal.

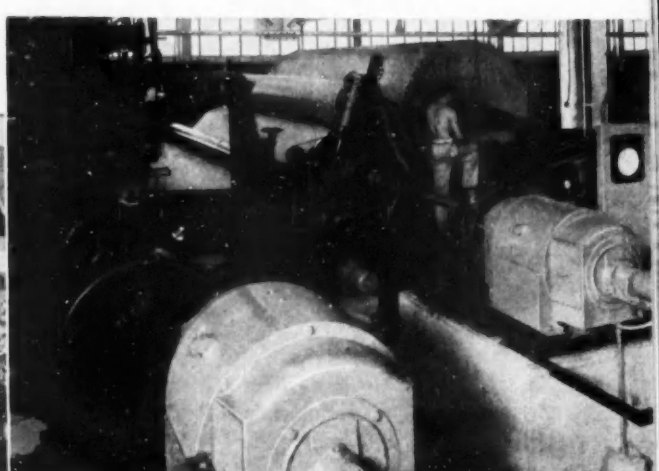
Continuous Output

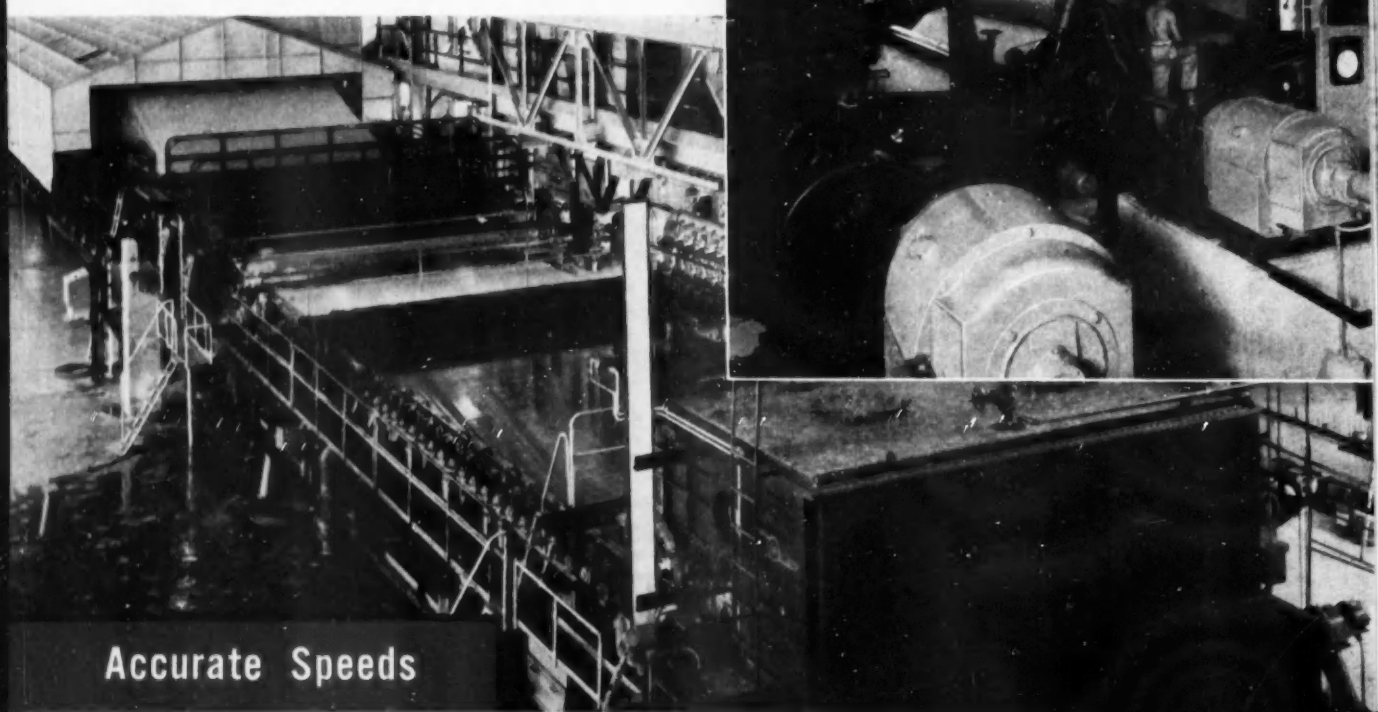


Co-ordinated G-E drive and furnace help produce up to 30 tons/hour of annealed strip. Adjustable voltage d-c generators co-ordinated by modern control provide smooth, fast, precise operation.

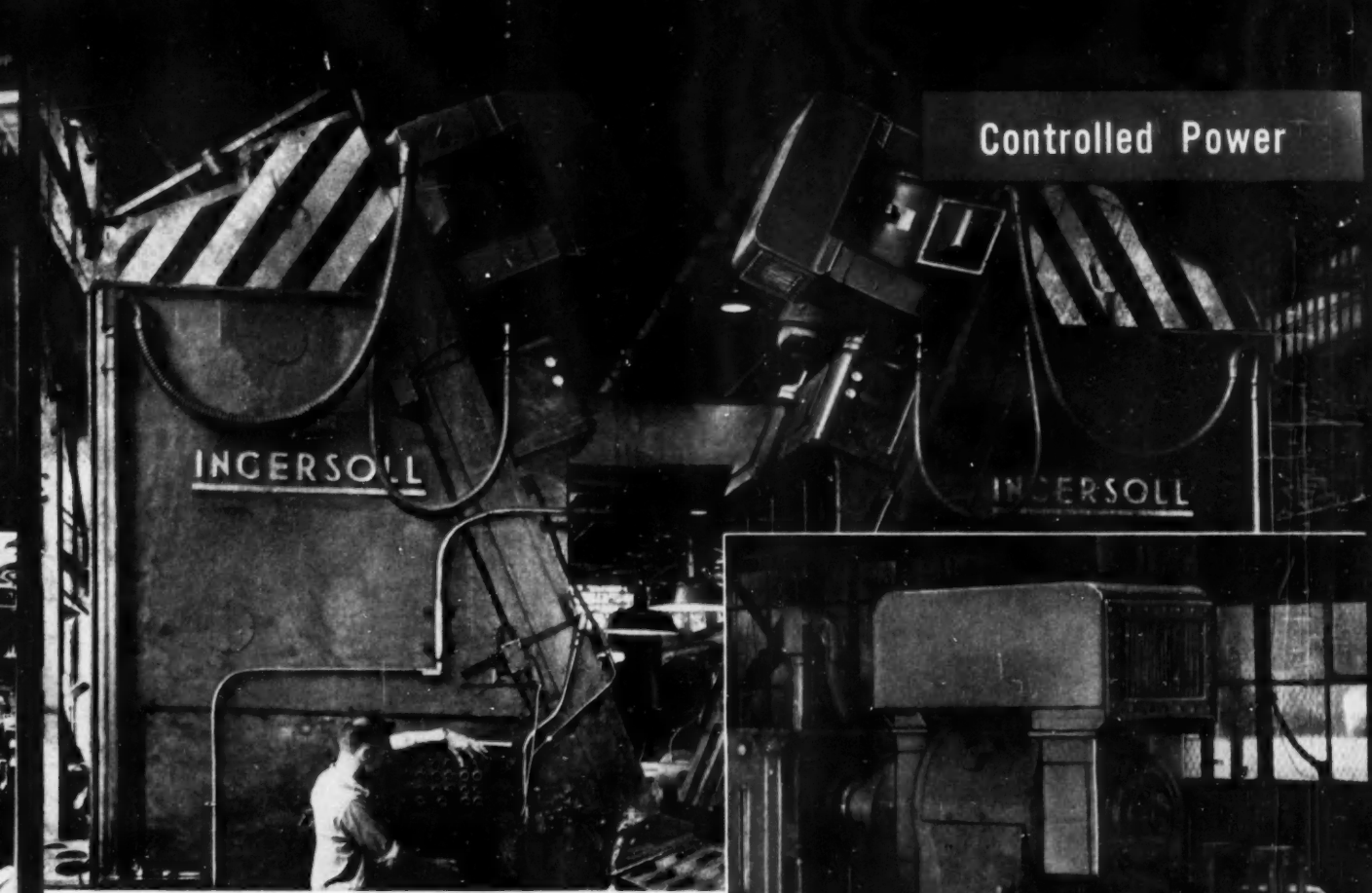
How General Electric d-c drives

Accurate speed from d-c drive co-ordinates sections of paper machine into fast flow of production—up to 300 tons/day. Mechanical design of machine is simplified, output increased.





Accurate Speeds



Controlled cutting power is provided by unit-cooled d-c motors. Torque and speed of this boring mill for diesel engine blocks is maintained at optimum point for long tool life and top production.

help make production automatic

DC MOTORS STEP UP PRODUCTION THROUGHOUT INDUSTRY

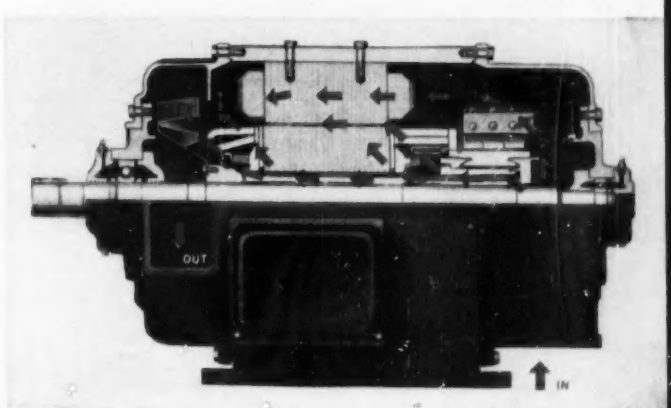
DC drives give you precise control of torque, speed, and power—essential in automatic production. The degree of precision depends on the steady performance and continuity of service of d-c motors and generators. In applications requiring close speed regulation, quick reversing, severe peak loads, G.E.'s complete line of Type CD-1000 motors is:

ECONOMICAL—the right speed at all times means less waste, fast production and low manufacturing costs per unit.

EASY TO MAINTAIN—built for long life with occasional inspection only—easily removable inspection covers. All connections are enclosed, yet easily accessible.

VERSATILE—Today's industry is more automatic than ever before. Regardless of application—in steel, paper, machine tool, and many other industries—G-E direct-current motors have gained the reputation of delivering continuous output at lower costs and accurate speeds for peak production.

FOR MORE INFORMATION, contact your nearest Apparatus Sales representative, or write for bulletin GEA-5497, general-purpose d-c motors, or GEA-6091A, totally-enclosed unit-cooled d-c motors. Section 810-4, General Electric Co., Schenectady, N. Y.



Excellent ventilating system gives positive ventilation to entire motor. Shaft fan on armature helps dissipate heat, keep within specific temperature rise.

GENERAL ELECTRIC

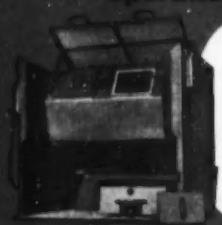
It's the Finish that Counts

ROTO FINISH

Roto-Finish COMPOUNDS AND CHIPS ARE MADE TO GIVE YOU THE PROPER FINISH ECONOMICALLY

There are other brands of materials that resemble Roto-Finish chips and compounds . . . but only Roto-Finish chips and compounds give you the *extra advantage* of continuous research by the company who originated the Roto-Finish processes. Roto-Finish chips and compounds are carefully manufactured so *you* obtain the best results on *your specific job*. To obtain the best results at the lowest cost . . . insist on ROTO-FINISH chips and compounds.

ROTO-FINISH puts your grinding, deburring descaling, polishing, brightening or coloring operations ON A MASS PRODUCTION BASIS



SAVES MAN HOURS AND MONEY by eliminating hand finishing.
GIVES ABSOLUTE UNIFORMITY...in any quantity.
MAINTAINS PRECISION TOLERANCES.
CUTS FINISHING costs as much as 80%.
LOWERS INITIAL and MAINTENANCE costs.

ROTO-FINISH COST-FREE ENGINEERING SERVICE GUARANTEES RESULTS

Put the experience and facilities of Roto-Finish to work for you on your special finishing problems.

Send a few unfinished parts to us . . . plus a finished part as a guide. We guarantee that you will get the same results in your plant that we produce in our laboratory. There's no obligation.

Write for fact-packed Roto-Finish catalog for complete information.

Roto-Finish COMPANY

ROTO FINISH

associated with The Sturgis Products Co.
3713 MILHAM ROAD, KALAMAZOO, MICH.

P. O. Box 988—
Phone 3-5578

FOREIGN REPRESENTATIVES: CANADA — Windsor — Fredric B. Stevens Canada Ltd. ENGLAND — London — Roto-Finish Limited — 39 Park Street — Mayfair • AUSTRALIA — Melbourne — A. Flavell Pty, Ltd. • HOLLAND — Delft — N. V. Roto-Finish Maatschappij — Rotterdamse — WEG 370A • AUSTRIA, GERMANY, SWITZERLAND — Frankfurt a.M. — Metallgesellschaft A.G., Germany • ITALY — Milan — Societa Roto-Finish a R.L. — Sesto S. Giovanni — Viale E. Marelli 31 • FRANCE — Paris — Societe Roto-Finish, 70 rue de la Republique-Puteaux (Seine) • BRAZIL — Rio de Janeiro — Commercial E. Industrial de Formos Werco, Ltds.

Dodge Engines

(*Continued from page* 55)

Overall length is increased by as much as 16 in. on some models.

The Custom Royal series incorporates a Super Red Ram V-8 engine of 183 hp and compression ratio of 7.6 to 1. A super-powered Super Red Ram V-8 develops 193 hp through use of four-barreled carburetor and dual exhaust system.

Royal and Coronet series have the new Red Ram V-8 engine of 175 hp. A development of Chrysler Corp.'s hemispherical combustion chamber engine, the new Red Ram design combines the advantages of this chamber with reduced weight and a simplified valve train. A single rocker shaft and rigid, lightweight rocker arms are featured.

In addition, the Dodge Get-Away Six engine, with horsepower rated at 123, is available on the Coronet series. This engine now boasts increased efficiency through use of a new dual-downdraft carburetor and intake manifold as standard equipment together with increased compression ratios.

A choice of two transmissions includes the fully automatic PowerFlite drive and standard transmission with or without overdrive. PowerFlite equipped cars have the gear selector lever mounted on the instrument panel.

Cars in the 1955 line are longer, lower and wider. Chrome hoods over the headlamps are designed to give an impression of forward motion. Windshields wrap around at both top and bottom of the glass.

A new rudder bar brake pedal and clutch pedal (with standard transmission) are suspended from the dash.

Optional new features on the 1955 Dodge line include power brakes, power-controlled seats, power window lifts, and a back seat hi-fidelity radio speaker. Tubeless tires are standard equipment for the first time on all cars.

Coaxial power steering, an integral unit with the steering gear mechanism, is available. All eight-cylinder models have a new symmetrical idler arm steering linkage, together with a new reduced friction steering gear.

AUTOMOTIVE INDUSTRIES
Keeps You Informed

Another Duplex Milling Machine

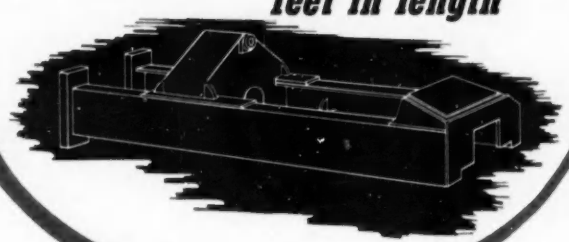
BY MOTCH & MERRYWEATHER

Fifty Years 1904 · 1954

STANDARDIZED TRAVELING HEAD DESIGN is adapted to *Many Specialized Jobs*

A Motch & Merryweather Duplex Milling Machine finishes the pads of an 8-foot tractor frame. A second frame (rear) is loaded while the first frame (front) is milled.

... especially for Large Parts 6 feet to 11 feet in length



Again using the facility of *traveling milling heads* instead of traveling fixtures, Motch & Merryweather creates greater universality; saves time, original cost and floor space. Standardized design enables duplex operation to dispatch a wide range of work with money-making speed and accuracy. Simplified fixturing is readily adjustable to handle parts of varying size. May we study your requirements?

THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, also Production Milling, Turning, and Special Machines

ON OUR WASHINGTON WIRE

Methods of settling Government contracts are described in a new "Contract Termination Guide."

Copies are available at $1 from U. S. Chamber of Commerce, Washington 6, D. C.

This year's $2.5 billion dip in military buying probably will be the last cut-back for a while. By the beginning of the new fiscal year next July 1, the economy program in effect around the Pentagon for the past year and a half will give way to a step-up in military buying that will spell total cash outlays to contractors of around $20 billion annually.

Five years of experimenting with guided missiles is finally beginning to pay off. It is now openly predicted around the Pentagon that guided missiles probably will reach the inter-continental stage within 10 years.

Preparation of abstracts for papers published on the Government synthetic rubber program during 1953 is in progress. The compilation is sold by Federal Facilities Corp., Washington 25, D. C., at $5 per set.

Business firms not on established Defense Dept. bid lists will get an opportunity to request permission to bid under a new Armed Services procurement regulation. Under the new plan, the military will publish lists of proposed procurement before actual bid specifications are ready.

Some manufacturers may be in doubt as to what common categories of items are bought by the services. An answer is available in the publication "Purchased Items and Purchasing Locations of the Dept. of Defense." A companion pamphlet is "How to Sell to the Dept. of Defense." These may be obtained at any major military buying agency or ordered from U. S. Government Printing Office, Washington 25, D. C. Combined price is 50¢.

Fabrics and fibers used in passenger cars will be studied in a new Agriculture Dept. survey.

Safety Plus!

The instrument panel pilot light hookup provided by Tung-Sol Signal Flashers is an important added safety feature. The driver *knows* his signals are working.

Tung-Sol makes All-Glass Sealed Beam Lamps, Miniature Lamps, Signal Flashers, Picture Tubes, Radio, TV and Special Purpose Electron Tubes and Semiconductor Products.

TUNG-SOL ELECTRIC INC.
Newark 4, N. J.

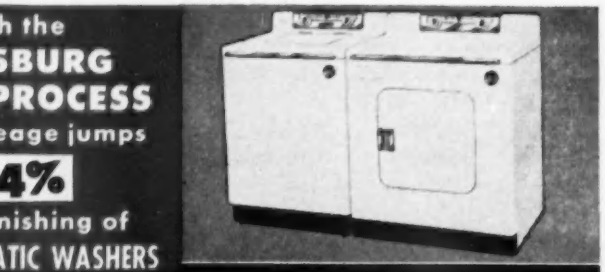
Sales Offices: Atlanta, Chicago, Columbus, Culver City (Los Angeles), Dallas, Denver, Detroit, Newark, Philadelphia, Seattle.

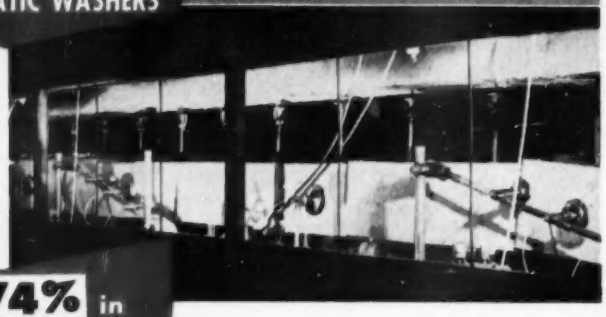
TUNG-SOL 50 YEARS ACHIEVEMENT

TUNG-SOL
SIGNAL FLASHERS
Make Driving Safer

BIG News
JOHNSON BRONZE NOW PRODUCES
POWDERED IRON PARTS
THIS newest development in powder metallurgy makes available machine parts from powdered irons, as companions to the famous bronze Ledaloyl bearings and bushings. There has been a demand for this material, particularly where low price is a determining factor, and where ferrous material has known advantages.
Component parts of powdered iron are pressed to exact shape, sintered and saturated with oil and, in quantities of a size, offer a great saving over their machined counterparts. They can be made in a wide selection of regular and complex shapes, usually ready for installation without machining or finishing
Physical properties of Johnson powdered iron parts can be varied by control of density and use of iron powder of different compositions. While these physical properties of powdered iron are somewhat lower than conventional materials for such parts, they compare favorably with cast iron.
You may have certain parts that are adapted to powdered iron. Write or phone for further information.
JOHNSON BRONZE COMPANY
625 South Mill Street, New Castle, Pa.
JOHNSON B BEARINGS
Sleeve-Type

with the
RANSBURG NO. 2 PROCESS
Paint mileage jumps
84%
in the finishing of
G-E AUTOMATIC WASHERS





...and **74%** in
finishing G-E DRYERS

Production is increased and quality of the work is improved over former hand spray method

● When General Electric formerly hand sprayed their home laundry equipment—automatic washers and dryers—they painted 9.74 washers with a gallon of paint. Now, in the new and modern plant at Appliance Park, Louisville—where they're using the Ransburg No. 2 Process—they get 17.97 units per gallon of paint. An increase of 84%!

And, where they formerly got 5.49 dryers per mixed gallon of finish, now—with the Ransburg No. 2 Electrostatic Spray Process—they get 9.56 dryers per gallon of paint. An increase of 74%!

Along with increased production, G.E. is getting a more uniform, higher quality finish. Another typical, on-the-job-example of the unmatched efficiencies of the Ransburg No. 2 Process of electrostatic spray painting!

Want to know what Ransburg Electrostatic Processes can do for you in your finishing department? Ask about the complete facilities for test-painting YOUR products—under simulated production conditions—in Ransburg laboratories.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana
RANSBURG

Experimental Tractor Engine

(*Continued from page 69*)

The configuration selected gives high power output and it was known to utilize fuel octane number effectively. Such details as ignition timing, valve timing, carburetion and manifolding also received considerable attention. Valve rotators were used on the exhaust valves.

The XO-121 is a four-cylinder engine with a bore and stroke of 3¾ in. by 4½ in. Its displacement is 199 cu in. It has overhead valves and is governed at 1600 revolutions per minute. Compression ratio, as already noted, is 12 to 1.

The experimental engine is powered by specially-blended gasoline of considerably higher antiknock value than is available to the public. It is not, however, a synthetic or trick fuel. It is a blend of some of the same base stocks used in the production of present-day fuels, plus tetraethyl lead, to give an octane number somewhat above 100.

In dynamometer tests, the experimental model was matched against the Oliver 70 engine of 1935 and a current Model 77 power plant. On the basis of specific horsepower output, the XO-121 was 92 per cent better than the 19-year-old engine and 44 per cent better than the present 77 engine. On fuel economy, the gains were 36 per cent and 30 per cent respectively. These improvements leave little doubt about the value of a well-designed, high compression engine that can take full advantage of gasoline antiknock quality.

The XO-121 never will be an assembly line engine. It was built purely as a research tool. However, it is quite practical in basic construction. The materials and basic components used are quite ordinary. On the other hand, all these parts have been carefully studied and integrated into the final design in such a way that each can contribute its full share to efficient production and power and fuel economy at an extremely high compression ratio.

Technical Training Center Set Up by GM in Mexico

General Motors de Mexico, S.A., has inaugurated a technical training center in Mexico City for service, repair, and maintenance of company products. The center, first of its kind in Mexico, is patterned after similar facilities set up by GM in the U. S.

McLouth
STAINLESS
Steel

High quality stainless sheet and strip steel . . . for the product you make today and the product you plan for tomorrow.

McLouth Steel Corporation
DETROIT, MICHIGAN
Manufacturers of Stainless and Carbon Steels

FOUNDATION
makes the difference

put your finish on a sound phosphate base . . .

NORTHWEST INTERLOX

Interlox was developed by Northwest's Cleaning Specialists to give you a better, more corrosion resistant, more easily controlled phosphate base for your organic finishes. It exceeds most government specifications.

Deposited as a fine, dense grain coating, Interlox is designed for spray or immersion type baths—zinc phosphate coatings or iron phosphate coatings.

Interlox deposits at a very rapid rate thus assuring a high-quality, uniform coating throughout the unusually long life of the bath.

Northwest's production-tested chemicals and "Right the First Time" recommendations will save you money. For the complete story on Interlox or any of the other Northwest Chemicals write or phone for a Cleaning Specialist.

Got a problem? Let our cleaning experts help you!

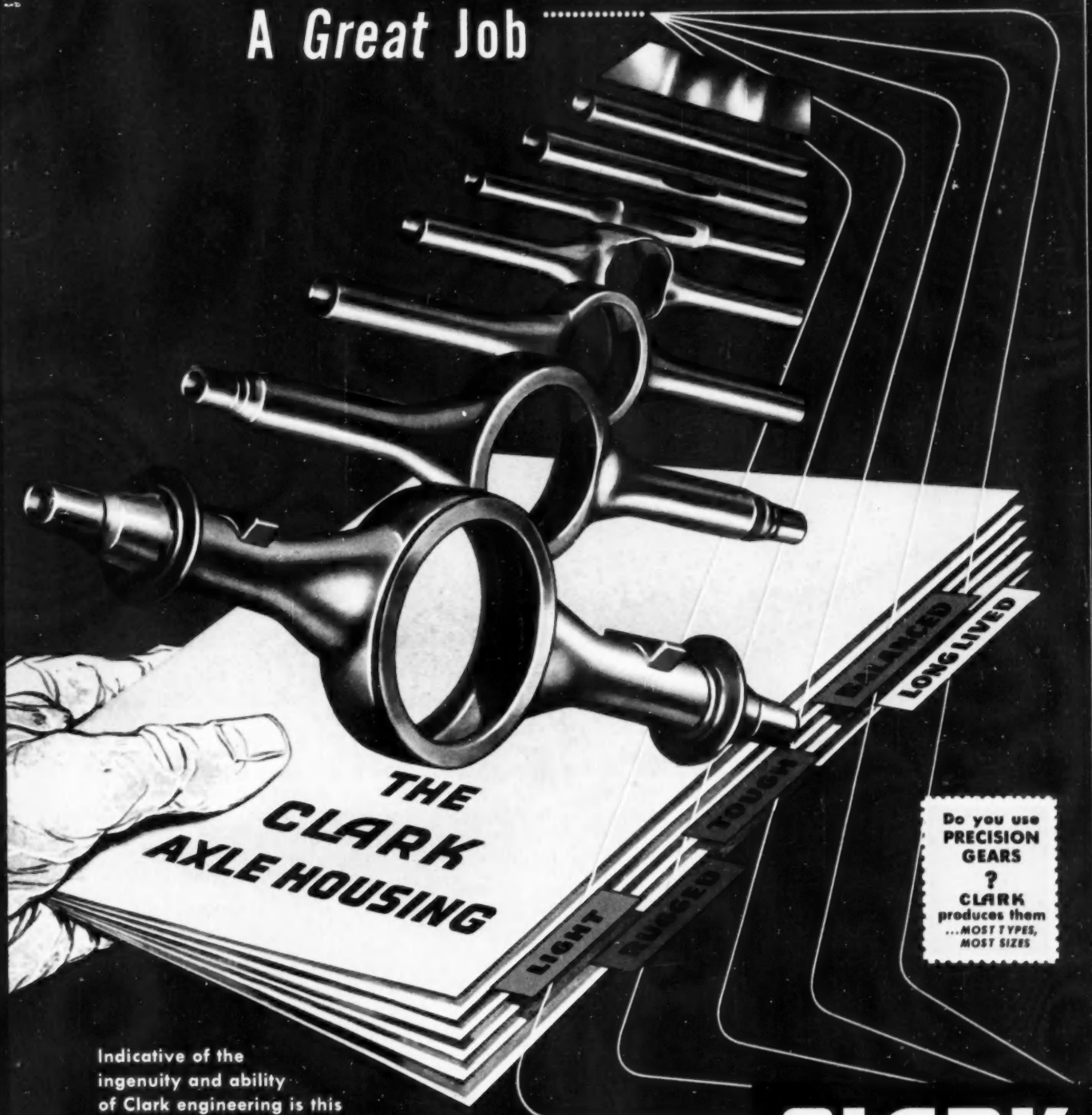
LO HI pH

NORTHWEST CHEMICAL CO.

9310 ROSELAWN DETROIT 4, MICH.

pioneers in pH cleaning control *serving you since '32*

A Great Job .....



Do you use **PRECISION GEARS** ? **CLARK** produces them ...*MOST TYPES, MOST SIZES*

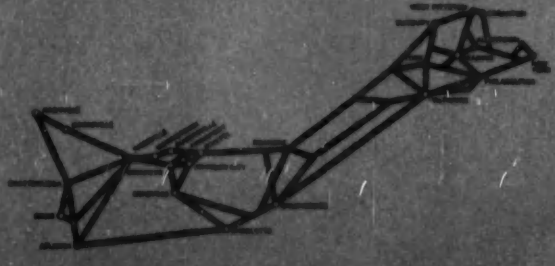
Indicative of the ingenuity and ability of Clark engineering is this one-piece heat-treated forging— an axle housing that because of its design adds to the long life, dependability and owner satisfaction of any vehicle of which it is a part! Another reason why you'll find it's "good business" to do business with Clark.

CLARK* EQUIPMENT

From Atlanta to New York, Mason and Dixon Lines, Inc.

has standardized on Clark!

Here's why: "For 16 months, we conducted a proving ground for five leading makes of fork trucks at our Kingsport, Tenn., home terminal," says Mr. S. T. King, Executive Vice President, Mason and Dixon Lines, Inc. "After exhaustive tests on our docks, after closely checking maintenance records and interviewing our drivers, we standardized on Clarks as the most practical for our operations."



Mr. King adds another reason for their choice: no other fork truck manufacturer could meet the requirements of his company with the nation-wide *service* coverage of the Clark dealer organization. From Atlanta to New York, the Mason and Dixon Lines finds a Clark dealer close to every terminal. These Clark dealers provide maintenance coverage for Mason and Dixon's 29-truck fleet of Clarks, and training schools have been conducted at 6 major terminals for Mason and Dixon personnel.

Mr. King concludes: "Fork trucks permit us to *expedite* freight and give our customers better service. There's less damage to goods, our housekeeping and efficiency are better. We benefit, but the important thing is that our customers benefit from our fleet of Clarks"!

Mason and Dixon, one of the *nation's largest* independent truckers, selected Clark on the same basis they select over-the-road transportation—for all-round efficiency. Whether you have one terminal or many, there's a nearby Clark dealer to help you improve your handling efficiency. Call him today—he's listed in the Yellow Pages of your phone book.

CLARK EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek, Michigan

'55 Chryslers and Imperials

(*Continued from page 61*)

alloy with elliptical contour skirts and a cast-in steel band controlling piston expansion, and hydraulic valve lifters.

The coaxial power steering offered by Chrysler for 1955 is distinguished by its clean, compact design. It is claimed to have fewer parts than any other integral power steering unit. New symmetrical idler arm steering provides stable steering ratios during turns and reduces tire wear. Front shock absorbers are mounted within the coil springs.

The PowerFlite automatic transmission is standard on New Yorker Deluxe models and special equipment on Windsor Deluxe models. The new chrome PowerFlite range selector lever is to the right of the engine indicator group on the panel.

Nylon bushings requiring no lubrication have replaced the bronze bushings previously used in brake linkage and the brake pedal is suspended from the dash. Power braking is standard on all New Yorker Deluxe models. The vacuum power unit and master cylinder are located on the engine side of the dash.

Tubeless tires are standard.

A new heater and a new, high-capacity air conditioning unit which is lighter in weight and provides more heating and defrosting capacity and improves accessibility to the engine. Both units take in air through a cowl ventilator.

Also available are four-way power seat control and power window lifts.

Imperial cars are available in two lines for 1955—the Custom Imperial on a 130-in. wheelbase and the Crown Imperial on a 150-in. wheelbase. Custom Imperials are offered in six-passenger sedan and Newport hardtop coupe. They are now a separate and distinct line of automobiles with bodies that are not shared by any other Chrysler-built cars.

The 250-hp FirePower V-8 hemispherical head engine powers the new Imperials. Among their features are:

PowerFlite automatic transmission with range selector on the dash; coaxial power steering; four-way power-operated front seat; double-width-pedal power brakes; a new heating and ventilating system; and a new high-capacity air conditioning unit.

Other features include power window lifts, search-tuning radio, and disk brakes—the only brakes of this type offered on an American automobile.

the A-B-C of M-S-T

A ALWAYS MAKES POSSIBLE
B BETTER PRODUCTS AT LOWER
C COST

Michigan Electric Resistance WELDED STEEL TUBING

A Quality Product

ROUND

⅜" to 4" O. D. 8 to 22 gauge

SQUARE-RECTANGULAR

½" to 2" O.D. 20 gauge
1" to 2¼", 14, 16, 18 gauge

Carbon 1010 to 1025

Michigan Tubing has uniform strength, weight, ductility, I. D. and O. D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

Steering Jacket

Ready for the automobile assembly line is this vital volume produced tubular part of a major control unit.

Lower tube end is reduced to 2.260" O. D. x 10.525" long, held to close tolerance for assembly in line with body of base tube without machining. Upper end is reduced to 2.125" O. D. x 2.562" long, held on center line to extremely close decimal dimensions, with two perforations at tapered section. Michigan workmanship can always be depended upon to assure the exacting tolerances and part uniformity to keep customer assembly operations moving smoothly.

Michigan engineers will be pleased to work with you on an adaptation of welded steel tubing to help you make your product better at lower cost.

Consult us for engineering and technical help in the selection of tubing best suited to your needs.

THE OLDEST NAME IN ELECTRIC RESISTANCE WELDED STEEL TUBING

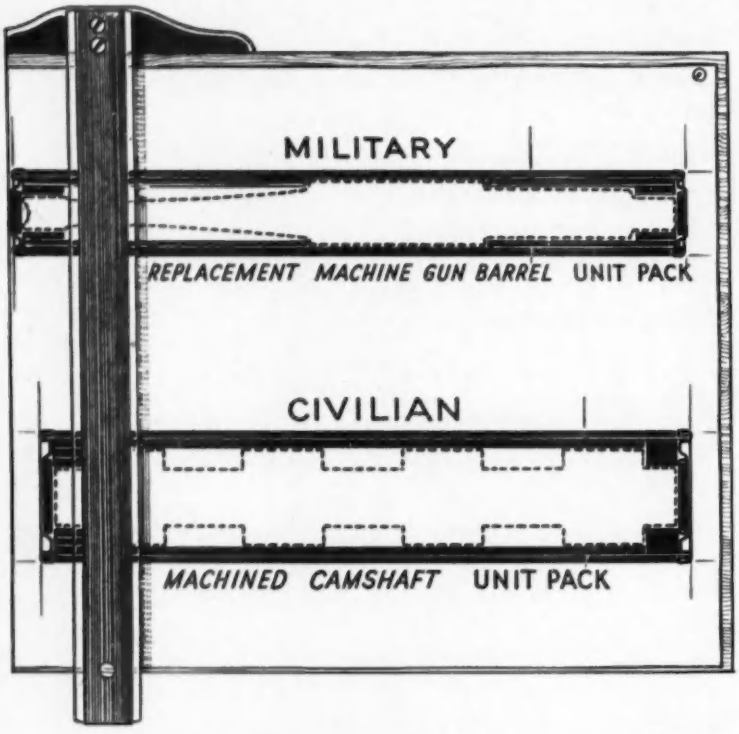
Michigan STEEL TUBE PRODUCTS CO.

More than 35 Years in the Business

9450 BUFFALO STREET • DETROIT 12, MICHIGAN

FACTORIES: DETROIT, MICHIGAN—SHELBY, OHIO

DISTRIBUTORS: Steel Sales Corp., Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—C. L. Hyland Co., Dayton, Ohio—Service Steel Co., Los Angeles, Calif.—Strong, Carlisle & Hammond Co., Cleveland, Ohio—Globe Supply Co., Denver, Colorado—W. A. McMichaels Co., Upper Darby, Pa.—A. J. Fitzgibbons Co., Buffalo, N. Y.—Harry E. Clark & Co., Houston, Texas—C. I. Crais Co., Birmingham, Ala.



CLEVELAND CONTAINERS

Military spare parts, highly machined metal parts, delicate electro-mechanisms and fragile items can be packaged better, and at less cost, in fibre containers.

CHECK THIS LIST OF ADVANTAGES

. . . May be constructed to meet all the requirements of Methods-1A, II and 1C4 Packaging, under approved military specifications.
. . . Low cost.
. . . Economical cubage and weight.
. . . Reduction or elimination of intermediate and overpacks.
. . . Tailored to your product—built-in cushioning, special barriers and liners where required.
. . . High resistance to side impact, bending and compression.
. . . High intraplant and feeder plant re-use.

The Cleveland Container Company offers skilled engineering help. Take advantage of the convenience and economy available in fibre containers.

Why pay more? For Good Quality . . . Call Cleveland!

The CLEVELAND CONTAINER Co.
6201 BARBERTON AVE. CLEVELAND 2, OHIO
• All-Fibre Cans • Combination Metal and Paper Cans
• Spirally Wound Tubes and Cores for all Purposes
PLANTS AND SALES OFFICES: Cleveland, Chicago, Detroit, Memphis, Plymouth, Wisc., Ogdensburg, N. Y., Jamesburg, N. J., Los Angeles • ABRASIVE DIVISION at Cleveland.
SALES OFFICES: Grand Central Terminal Bldg., New York City; Washington Gas Light Bldg., Washington, D. C.; West Hartford, Conn.; Rochester, N. Y.
Cleveland Container Canada, Ltd.: PLANTS AND SALES OFFICES: Toronto and Prescott, Ont. • SALES OFFICE: Montreal.

More Defense Contract Awards

THIS latest list of defense prime contracts that have been awarded covers the period from September 15 to October 25, 1954. Items included in this list are for various types of automotive military equipment, including tanks, motorized gun carriages, trucks, airplanes, automotive components and spare parts, automotive maintenance equipment, etc.

AIR ASSOCIATES, INC., Teterboro, N. J.
Parts for T28B aircraft—Various—$222,565
Actuators—Various—$65,836

AMERICAN BOSCH ARMA. CORP., American Bosch Div., Springfield, Mass.
Repair parts—44,460—$153,508

BENDIX AVIATION CORP., Bendix Products Div., South Bend, Ind.
Parts—Various—$133,837
Pump assemblies—392 ea.—$770,127
Maintenance parts—15,000 ea.—$521,310
Coupling, valve, diaphragm—Various—$649,229

BENDIX AVIATION CORP., Red Bank Div., Eatontown, N. J.
Dynamotor—1012—$86,698

BENDIX AVIATION CORP., Scintilla Div., Sidney, N. Y.
Spare parts—Various—$584,785
Maintenance parts—Various—$27,814

BOEING AIRPLANE CO., Seattle, Wash.
B-52D airplanes, spare parts, special tools—50 ea.—$223,166

BOEING AIRPLANE CO., Wichita, Kan.
B-52 airplanes—$10,000,000
B-52D airplanes, spare parts—$83,000,000

BORG-WARNER CORP., Pesco Products Div., Bedford, Ohio
Maintenance parts—Various—$38,790

CATERPILLAR TRACTOR COMPANY, Peoria, Ill.
Road rollers—12 ea.—$21,287
Tractor and acc.'s—1 ea.
Bituminous concrete mixing plant—1 ea.—$31,110

CESSNA AIRCRAFT CORP., Wichita, Kan.
Aircraft T-37A—11 ea.—$3,962,920

CHRYSLER CORPORATION, Detroit, Mich.
Parts and/or assemblies for tank, T48 and T43—$250,000

COCKSHUTT FARM EQUIPMENT, LTD., Brantford, Ontario, Can.
Plows—15 ea.—$4,063

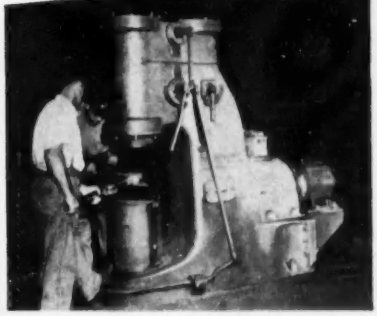
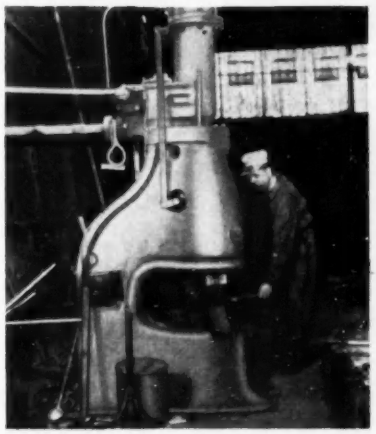
CONSOLIDATED VULTEE AIRCRAFT CORP., Fort Worth, Tex.
Facilities for production of B-58 aircraft—$266,250

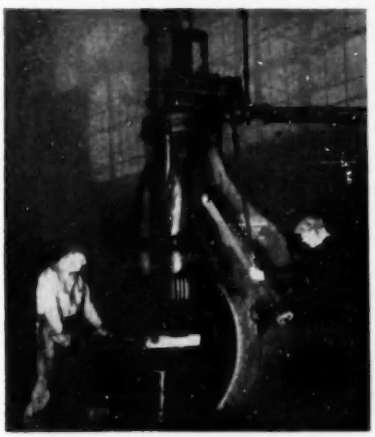
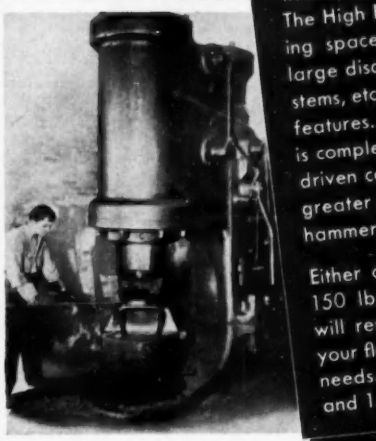
CUMMINS ENGINE CO., Columbus, Ohio
Repair parts—25,685—$88,028

CURTISS-WRIGHT CORP., Propeller Div., Caldwell, N. J.
Prop assembly—3 ea.—$149,411
Nacelle control sets—6 ea.
Lock washer—125 ea.—$380,537
Facing Spline Disc.
Brake—2501 ea.
Bushing—2178 ea.

(*Turn to page* 150, *please*)

For Flat Die Forging, Blacksmithing, or Tool Dressing

CALL it what you will, you have the choice of two superior hammers: the Chambersburg High Frame Hammer, operating on steam or air; and the Chambersburg Motor Driven Pneumatic Forging Hammer, which can operate anywhere, independent of steam or air lines. The High Frame Hammer has ample working space, adaptable to the forging of large discs and rings, the upsetting of high stems, etc., and has many other outstanding features. The Pneumatic Forging Hammer is completely self-contained, with its motor driven compressor built-in. It is capable of greater forging output than any other hammer of its type.

Either or both hammers, whether it be a 150 lb., a 600 lb. or a giant 6000 lb., will represent a profitable investment for your flat die, blacksmithing or tool dressing needs. Write today for Bulletins 1-L-9 and 16-L-9.

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Builders of THE IMPACTER
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precision valve gear parts

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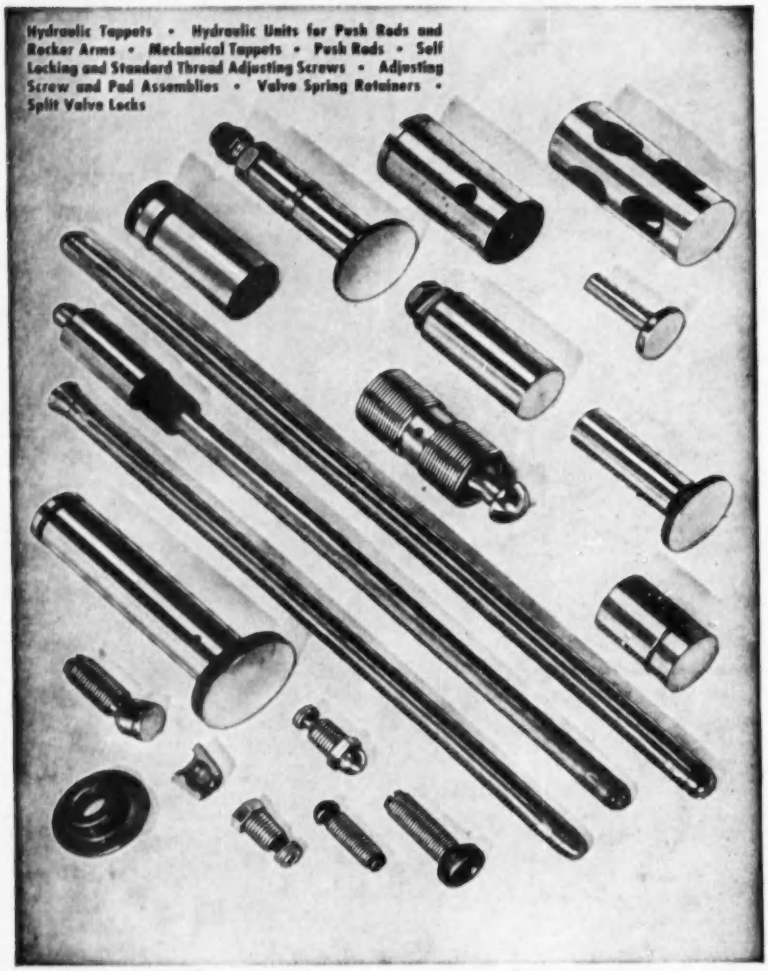

Hydraulic Tappets • Hydraulic Units for Push Rods and Rocker Arms • Mechanical Tappets • Push Rods • Self Locking and Standard Thread Adjusting Screws • Adjusting Screw and Pad Assemblies • Valve Spring Retainers • Split Valve Locks

Connecting Rod Bolts ..... **Hydraulic Cylinder Pistons**
Cylinder Head Studs ..... **Cylinder Head Cap Screws**
Main Bearing Studs ..... **Main Bearing Cap Screws**
Flywheel to Crankshaft Screws ..... **Diesel Energy Cells**
Wheel Bolts and Studs ..... **Differential Carrier Screws**
Oil Pump to Distributor Shafts ..... **Rocker Arm Shafts**
Automatic Transmission Valves ..... **Water Pump Shafts**
Roller Followers ..... **Ball Joint Assemblies**

External and Internal Grinding, Thread Grinding, Precision Roll Threading

Heat Treating • Carbon Restoration • Carburizing • Carbo Nitriding • Cyaniding • Hydrogen Brazing • Complete Metallurgical, Dynamometer and Testing Laboratories

Special Screw Machine Parts 1/16" to 5" Diameter • Cold Upset 3/16" to 1" Diameter • Cap Screws • Set Screws • Nuts • Studs • Taper Pins • Socket Screw Products

The CHICAGO SCREW COMPANY
2801 WASHINGTON BLVD.
BELLWOOD, ILLINOIS
Established 1872

(*Continued from page* 148)

Nut, blade retaining—6000 ea.—$405,840
CT634S-E preps installation—76 ea.—$5,456,335
CT634S-E preps spares—31 ea.
Spinner assys—76 ea.

CURTISS-WRIGHT CORP., Wright Aero Div., Wood-Ridge, N. J.
Maintenance and overhaul tools for J65 engines—$351,200
Spare parts—YJ65-W-1, 1A engine—$270,000

DIAMOND T MOTOR TRUCK SALES, Washington, D. C.
Truck with garbage body—4 ea.—$26,116

FAIRCHILD ENGINE AND AIRPLANE CORP., Fairchild Aircraft Div., Hagerstown, Md.
C-123 aircraft and B-52 sub assemblies—$123,600

FOOD MACHINERY & CHEMICAL CORP., San Jose, Calif.
Vehicle, armored infantry, tracked T59—1080 ea.—$26,558,280

FORD MOTOR COMPANY, Ford Division, Washington, D. C.
Delivery trucks—17 ea.—$21,888

FORD MOTOR COMPANY, Chicago, Ill.
J57-F-13 turbojet engines—60—$22,208,200

GALION IRON WORKS AND MFG. CO., Galion, Ohio
Motorgrader—1 ea.—$85,827

THE GARRETT CORP., Los Angeles, Calif.
Gas turbine compressors—203—$3,877,822

GENERAL DYNAMICS CORP., Convair Div., San Diego, Calif.
Aircraft spare parts special tools and data—$2,800,000

GENERAL ELECTRIC CO., Phila., Pa.
Repair parts for Diesel engines—40—$126,000

BENDIX AVIATION CORP., Red Bank Div.,

GENERAL METALS CORP., Adel Div., Burbank, Calif.
Pumps—Various—$90,682

GENERAL MOTORS CORP., Allison Div., Indianapolis, Ind.
T56-A-1-turbo-prop engine—288 ea.—$36,304,800
J71-A-9 turbojet engines—275—$34,004,205

GENERAL MOTORS CORP., Cleveland Diesel Engine Div., Cleveland, Ohio
Repair parts—58—$32,458

GENERAL MOTORS CORP., Detroit Diesel Engine Div., Detroit, Mich.
Repair parts—73,285—$91,265

GENERAL MOTORS CORP., GMC Truck & Coach Div., E. Pontiac, Mich.
Eight user test pilot models, truck, amphibious 2½, 4 ton, 6x6—RAD—916,208
Modification of one truck, amphibious, 2½ ton, 6x6—RAD—$63,636

THE B. F. GOODRICH CO., Akron, Ohio
Wheel assy—Various—$65,485

THE B. F. GOODRICH CO., Dayton, Ohio
Wheel assembly—984—$37,098

THE GOODYEAR TIRE & RUBBER CO., INC., Akron, Ohio
Wheel and brake assy.—Various—$50,869
Wheel assy.—137 ea.—$25,690

(*Turn to page* 154, *please*)

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faster

cheaper

automationally with GM STEEL tubing

HEADED OR INSERT TYPE PUSH RODS

From the initial strip steel to the final packaged product, one continuous process makes GM Steel Tubing and converts it into finished push rods.

Here is a perfect example of how modern "automation" can produce *better* products *faster* and for *less money.* Why not find out today how Rochester Products and GM Steel Tubing can *automation*ally do the same for you.

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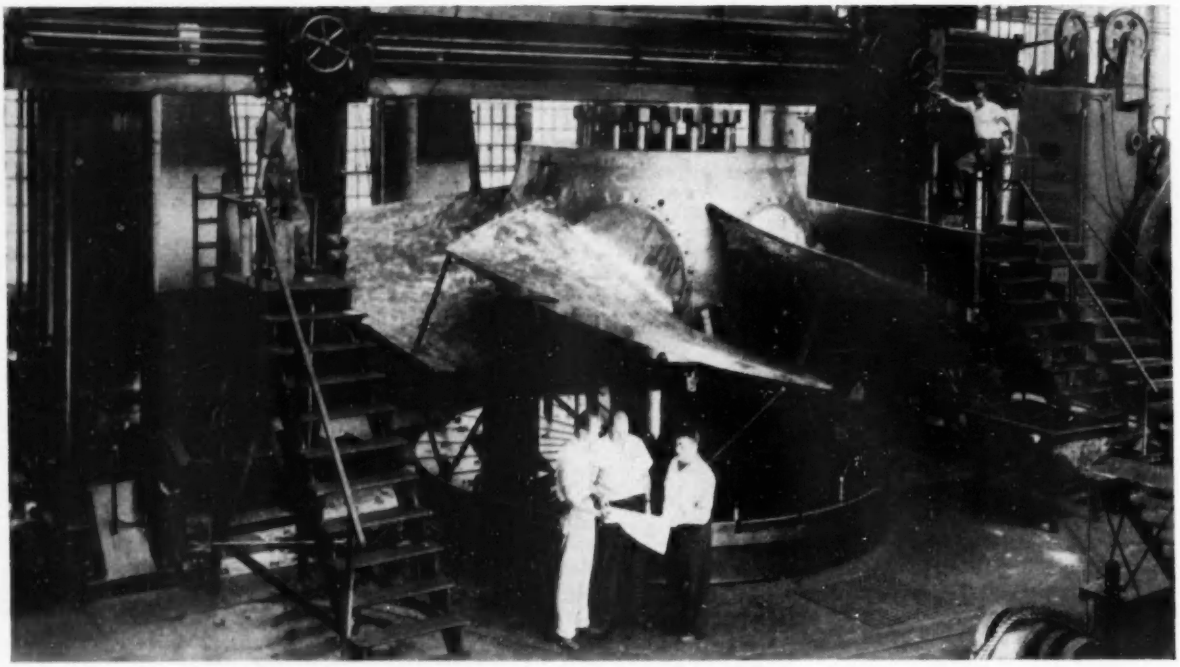
ALSO MANUFACTURERS OF ROCHESTER CARBURETORS AND ROCHESTER CIGAR LIGHTERS

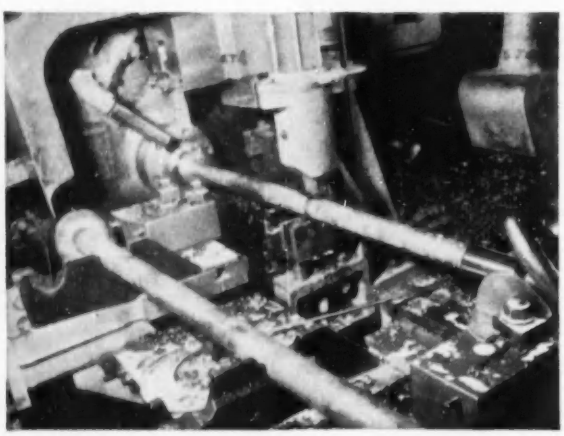
From on-the-job reports

PRODUCTION INCREASES UP TO 30%



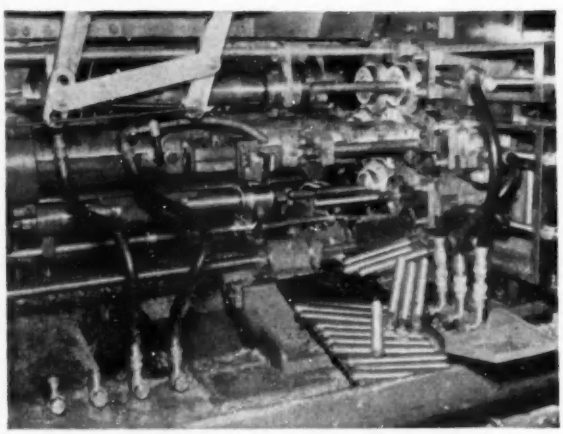
PROPELLER RUNNER. Grade 370 cut machining of tip contours on 165-ton runner from 220 to 65 hours. Carbide takes interrupted cuts through heavy scale at 3 times former speed, with 88% less downtime.

SETUP: Material—Welded high-tensile carbon steel (A 148-50 T, GR 80-50). **Speed**—154 SFPM. **Feed**—1/32 inch. **Depth of cut**—7/16 inch. **Coolant**—No.



TRUCK AXLE FORGING. Turning with Grade 350 resulted in 33% more pieces per tool. Chipping and flaking, encountered with previously used tools, were eliminated.

SETUP: Material—AISI 4150 steel forging. **Speed**—200 SFPM on 2-inch diameter; 400 SFPM on 4-inch diameter. **Feed**—0.014 inch. **Depth of cut**—1/16 to 1/8 inch. **Coolant**—Yes.



THREADED LEVELING SCREWS. Carboloy Grade 370 tools, used in 6-spindle Cone Automatic, boosted production to 944 screws per hour, compared to 140 with steel tools.

SETUP: Material—SAE B1112 one-inch diameter steel screw stock. **Speed**—1586 RPM for threading. **Feed**—0.005 inch for chamfering and cutoff. **Coolant**—Yes.

WITH NEW CARBOLOY® SERIES 300 STEEL-CUTTING CARBIDES

Case histories prove Grades 350 and 370 outperform, outlast other carbides on tough steel-cutting jobs.

Carboloy Grades 350 and 370 are capable of cutting more cubic inches of steel per minute, with longer tool life, than any other carbides. This has been *proved* on in-the-plant applications, where these grades have boosted production as much as 30% over previous carbides used.

Grade 350 for medium-duty steel cutting, and Grade 370 for heavy-duty steel cutting, are of a new family of carbides, manufactured by an entirely new process.

Both grades have a built-in structural rigidity that enables them to operate at temperatures as high as 1800°F without the tip deformation found in other carbides. They combine superior wear resistance and extreme toughness to a degree never before possible.

Full stocks now available from Authorized Carboloy Distributors

Standard Carboloy Tools are available in Grades 350 and 370. In addition, blanks and inserts of each grade are available in a wide range of styles and sizes.

Carbides for *any* machining job. Regardless of your particular machining problem, a grade of Carboloy cemented carbide is available to handle it. Over a quarter century of experience in machining ferrous and nonferrous, metallic and nonmetallic materials has been acquired by the Carboloy organization. See your Authorized Carboloy Distributor or Carboloy salesman for qualified, expert machining assistance.

CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

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Department of General Electric Company
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Send new Price List GT-300, containing specifications and prices on new Grades 350 and 370.

Name_____ Position_____

Company_____

Address_____

City_____ Zone____ State_____

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"ONE OF THEIR STANDARD RESISTANCE WELDERS COULD BE THE ANSWER"
● Like any other commodity, when you buy a standard resistance welder instead of a special, you save money and get shorter delivery.
Perhaps you have been thinking in terms of a "special" welder when a standard might do the job. T-W is a logical source because they make more standard spot, seam, flash-butt and projection welders than any other manufacturer, in addition to a wide variety of special welders.
From T-W, you can receive the necessary data on which to base a decision, such as: a comparison of a standard and a special; power requirements (three-phase or single phase); rates of production; welding cost per unit of production; installation recommendations.
Outline your needs to the nearest T-W sales office or the home base in Warren, Ohio. Prompt reply to your inquiry.

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OAKVILLE AND WINDSOR, ONTARIO

TAYLOR-WINFIELD
RESISTANCE WELDERS

THE TAYLOR-WINFIELD CORPORATION • WARREN, OHIO

(*Continued from page* 150)

HILLER HELICOPTERS, Palo Alto, Calif.
Plate assy.—Various—$118,503

HOLLEY CARBURETOR CO., Detroit, Mich.
Maintenance parts—Various—$34,694

INTERNATIONAL HARVESTER CO., Washington, D. C.
Trucks—10 ea.—$38,114

LEAR, INC., Grand Rapids, Mich.
Actuator and spare parts—Various—$64,664

LOCKHEED AIRCRAFT CORP., Marietta, Ga.
Facilities—$847,000
Airplanes, spare parts tr. tools, ground handling equipment—$30,000,000

MARION POWER SHOVEL CO., Marion, Ohio
Crane, crawler mtd.—9 itm.—$311,940

MASSEY-HARRIS COMPANY, Washington, D. C.
Tractors—4 ea.—$17,921

NATIONAL SUPPLY CO., Engine Div., Springfield, Ohio
Engines, 40-SX-8—4 ea.—$254,400

NORTH AMERICAN AVIATION, INC., Los Angeles, Calif.
Facilities for production of F-100 aircraft—$2,546,000

OSHKOSH MOTOR TRUCK, INC., Oshkosh, Wis.
Truck, cab and chassis—8 ea.—$53,200

PACIFIC CAR & FOUNDRY CO., Renton, Wash.
Final drive replacements—$2,383,066

PARKER AIRCRAFT CO., LOS ANGELES, Calif.
Maintenance parts—Various—$60,017

REO MOTORS, INC., Lansing, Mich.
Parts—6575 ea.—$30,829

SHELDON MACHINE CO., Chicago, Ill.
Lathe; 12 in.—$26,449

THOMPSON PRODUCTS, INC., Cleveland 17, Ohio
Pump: hydraulic—166 ea.—$177,373
Fuel pump assy.—Various—$54,130

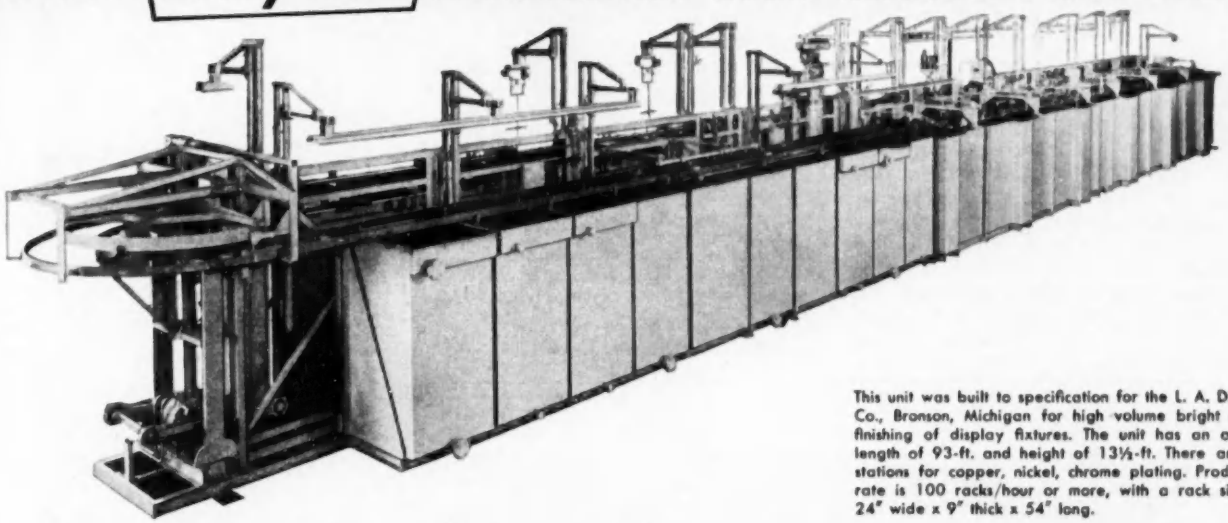
TWIN DISC CLUTCH CO., Racine, Wis.
Repair parts—19,035—$228,145

WILLYS MOTORS COMPANY, Toledo, Ohio
Light trucks—54 ea.—$75,785

BOOKS . . .

STRENGTH AND RESISTANCE OF METALS, *by John M. Lessells, published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Price, $10.00.* The aim of this volume on the strength and resistance of metals is to provide the senior and graduate student as well as the design engineer with information on the behavior of metals under stress as it has been revealed by numerous workers in this field. Most of the discussion centers around the behavior of steel because this is still the prime material of engineering products; based on elastic theory, as discussed in the usual books on strength of materials. Nevertheless, mention is made of non-ferrous alloys and cast iron in those particular instances where their behavior differs from that of steel.

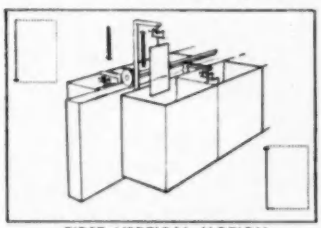
ONLY Wagner BROTHERS CAN OFFER YOU THIS



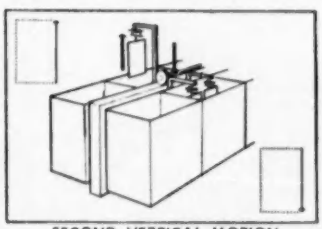
This unit was built to specification for the L. A. Darling Co., Bronson, Michigan for high volume bright metal finishing of display fixtures. The unit has an overall length of 93-ft. and height of 13½-ft. There are 27 stations for copper, nickel, chrome plating. Production rate is 100 racks/hour or more, with a rack size of 24" wide x 9" thick x 54" long.

Revolutionary Concept in plating automation...

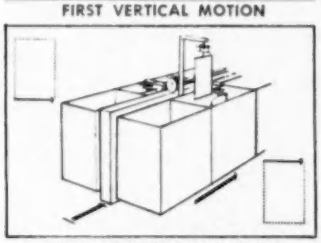
The Wagner Brothers Automatic is a complete and fully automatic mechanism, incorporating a revolutionary vertical transfer and return type work conveying principle which eliminates elevating superstructure, transfer cams, chains and sprockets and hydraulic cylinders above tanks. Many unique design features combine to make this mechanism a smooth operating, perfectly timed unit requiring less than ½ the power of comparably sized units.



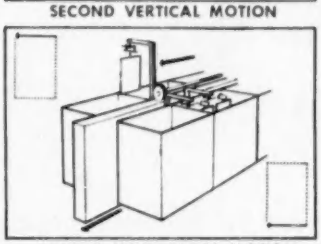
FIRST VERTICAL MOTION



SECOND VERTICAL MOTION



FIRST HORIZONTAL MOTION



SECOND HORIZONTAL MOTION

HOW IT WORKS

All transfer and conveying mechanism is mounted on a reciprocating carriage located between the two rows of tanks. Two basic movements are used to bring parts through the full plating cycle; one forward and reverse straight line horizontal motion and one raising and lowering vertical movement.

Plating racks are attached to work-carriers at the loading station. When the machine is started, lifting arms fixed to the carriage engage the work-carriers being transferred and lift them at all transfer points on one side of the machine, carry them forward to the next station where they are lowered and disengaged from the lifting arm. This sequence is simultaneously produced in reverse on the opposite side so that, when the lifting arms are being lowered on one side, they are raised on the other side.

ADVANTAGES

SMOOTH OPERATION—Operates so smoothly that you can balance a full water glass on the transfer mechanism throughout the entire plating cycle. Obviously such smooth operation will save you time now spent salvaging parts from tanks; dropped there because of the jolting transfer action of ordinary machines. This smooth, positive performance is accomplished because of our hydromotor principle which makes each start and stop gentle as a breeze.

LOW POWER REQUIREMENTS—Powered by one 10 hp motor, this installation uses less than half the power required by comparably-sized units. This is possible because of the almost perfect balance of work load being lifted at one time.

SIMPLE INSTALLATION—Your Wagner Brothers Automatic is delivered to you, either intact or in two or three completely assembled sections, depending upon size. Installation is simply a matter of positioning and leveling.

MINIMUM OF MAINTENANCE—There are few moving parts to wear, no vibrating parts, no backlash in automation, nor little chance of misalignment. Overload protection is given by a by-pass in the hydraulic pump. All working parts can be reached for adjustment without disassembly.

OTHER PLUS FEATURES—Wagner Brothers Automatics require a minimum of space. The model illustrated uses 54-inch racks and operates under a 13½-ft. ceiling. There are no greased parts or hydraulic fittings over tanks where dripping oil could contaminate solutions. Triple contacts on cathode bars afford consistent, uninterrupted current flow. Automatic heat control system gives simple, foolproof regulation of temperature for accurate results. Centralized lubrication can be provided as an optional feature. Drag and dwell times are easily varied with this unit. **Write for free, illustrated folder.**

In addition to high-volume plating, the Wagner Brothers' Automatic is equally well-suited to anodizing (sulphuric and chromic), phosphate coating, etching, electropolishing, oxide coating.

YOUR *PRIMARY* SOURCE FOR PLATING AND POLISHING EQUIPMENT AND SUPPLIES

Wagner BROTHERS, INC.

437 MIDLAND AVE. • DETROIT 3, MICHIGAN

New Defense Facilities

SUPPLEMENTING the list of Certificates of Necessity issued up to August 25, 1954, authorizing new or expanded defense plant facilities for the manufacture of automotive and aviation war goods which was published in the October 15 issue, page 144, of AUTOMOTIVE INDUSTRIES, the following additional certificates were announced by the Office of Defense Mobilization, covering the period from August 26 to October 6, 1954.

The figure appearing in parentheses is the percentage authorized in respect to actual fast tax write-offs.

ALLOY PRODUCTS COMPANY, Marion, Ind.
Components for aircraft engines—$95,000 (45)

ALUMINUM COMPANY OF AMERICA, Cleveland, Ohio
Titanium forgings for military aircraft—$300,000 (65)

BELL AIRCRAFT CORP., Wheatfield, N. Y.
Military aircraft—$70,615 (65)
Military aircraft and parts—$43,500 (60)

CUMMINS ENGINE COMPANY, INC., Columbus, Ind.
Research and development (Diesel engines)—$528,000 (45)

H. L. DIEHL COMPANY, Coventry, Conn.
Components for military aircraft—$86,500 (65)

EX-CELL-O CORPORATION, Lima, Ohio
Components for military aircraft—$151,341 (65)

HILLER HELICOPTERS, San Mateo, Calif.
Military helicopters—$24,672 (60)
Helicopters and spare parts—$240,248 (70)

LOCKHEED AIRCRAFT CORP., Burbank, Calif.
Military aircraft—$117,009 (60)

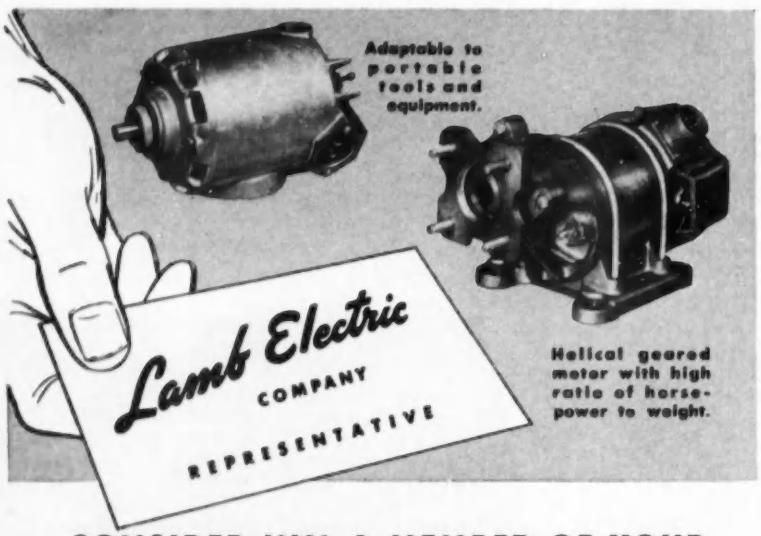
MALLINCKRODT CHEMICAL WORKS, St. Louis, Mo.
Columbium-tantalum—$624,000 (80)

THE GLENN L. MARTIN COMPANY, Baltimore, Md.
Military aircraft—$68,268 (65)

NILES-BEMENT-POND CO., Chandler-Evans Div., West Hartford, Conn.
Aircraft parts—$855,000 (40)

NORTHROP AIRCRAFT, INC., Hawthorne, Calif.
Military aircraft—$100,147 (60)

THIEBLOT AIRCRAFT COMPANY, INC., Martinsburg, W. Va.
Research and development on aircraft—$60,000 (60)


Adaptable to portable tools and equipment.
Lamb Electric
COMPANY
REPRESENTATIVE
Helical geared motor with high ratio of horsepower to weight.

CONSIDER HIM A MEMBER OF YOUR

Engineering Staff...

Many companies are finding it quite helpful to call in the Lamb Electric district engineer for suggestions, when designing a new motor-driven product or redesigning an existing one.

Through close cooperation of the manufacturer's engineering department and Lamb Electric engineers, such advantages as reduced costs, improved appearance, greater compactness and lower weight are often obtained.

The time to realize the full benefit of this teamwork is while your product is still in the blueprint stage.

THE LAMB ELECTRIC COMPANY • KENT, OHIO
In Canada: Lamb Electric — Division of Sangamo Company Ltd. — Leaside, Ont.

Lamb Electric
SPECIAL APPLICATION FRACTIONAL HORSEPOWER MOTORS

Postwar Worker Investment By Industry Found High

In early 1954, the U. S. Chamber of Commerce, through its Economic Research Dept., conducted a survey of postwar investment per job. The study was restricted to industrial and public utility companies which had constructed new facilities since 1945.

Preliminary analysis of the data revealed an average (median) postwar investment per job of $12,605. The individual company figures for postwar investment per job ranged from $3000 to $163,000. The table below identifies cost factors.

POSTWAR INVESTMENT PER WORKER

Cost Element	Cost	% of Total
Machinery and Equipment	$ 3,197	25.5%
Building	3,155	25.0
Inventory	2,943	23.4
Working Capital	2,868	22.8
Financing Costs	232	1.8
Land	186	1.3
Miscellaneous	24	0.2
Total	$12.605	100.0%

AMA Issues 34th Edition Of "Facts and Figures"

A wealth of data ranging from information about drivers to vehicle sales statistics is found in the 34th edition of "Automobile Facts and Figures," just released by the Automobile Manufacturers Association. This year's publication contains quite a few new statistics.

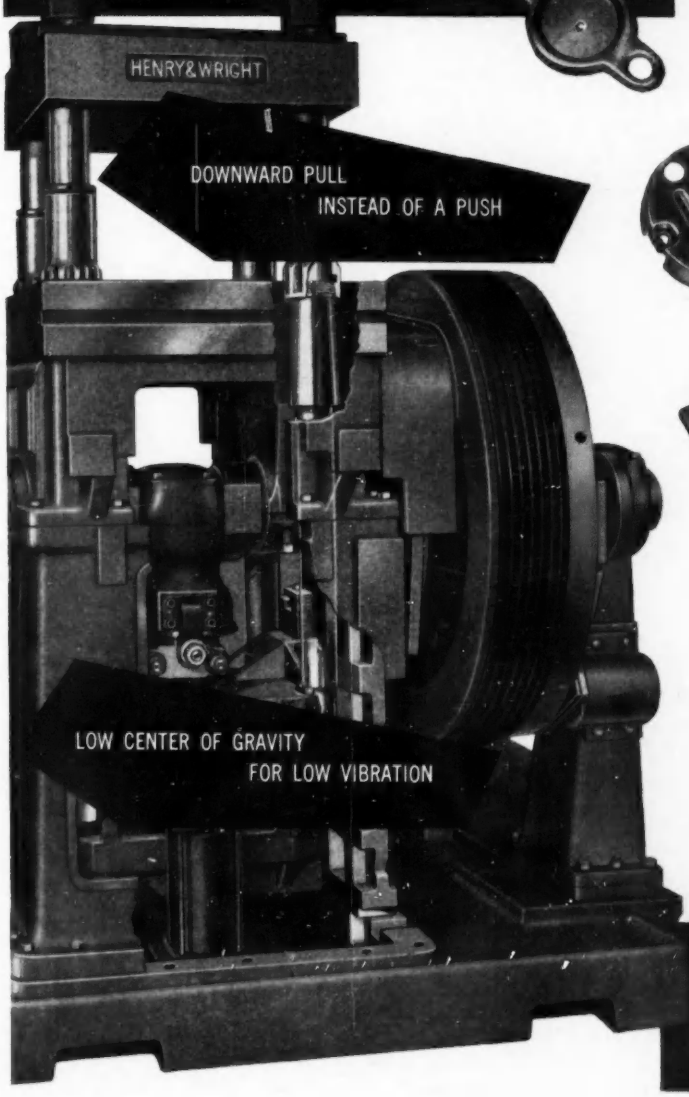
YOU CAN LINE UP 1 JOB AFTER JOB

The Henry & Wright Dieing Machine is easy enough to set up so that moderate production runs are profitable.

You can schedule one job after another. Your H & W will get the work out, get it out right, and have it done when the schedule says it ought to be done.

Simple jobs that you want to complete at high speed. Close tolerance work. Tricky reverse bends. Full assemblies at one pass through the press. They all will go through your Henry & Wright, and with surprisingly short interruptions for setting up.

Four corner control of side thrust, and a downward pull instead of a push: These are two of the reasons why your Henry & Wright will withstand more off-centering of the die loads. Jobs like those shown can be easily run in sequence on an H & W.



Henry & Wrights are making production runs that designers never had dreamed could be stamped at a profit. Our representative would like to show you some of the pieces.

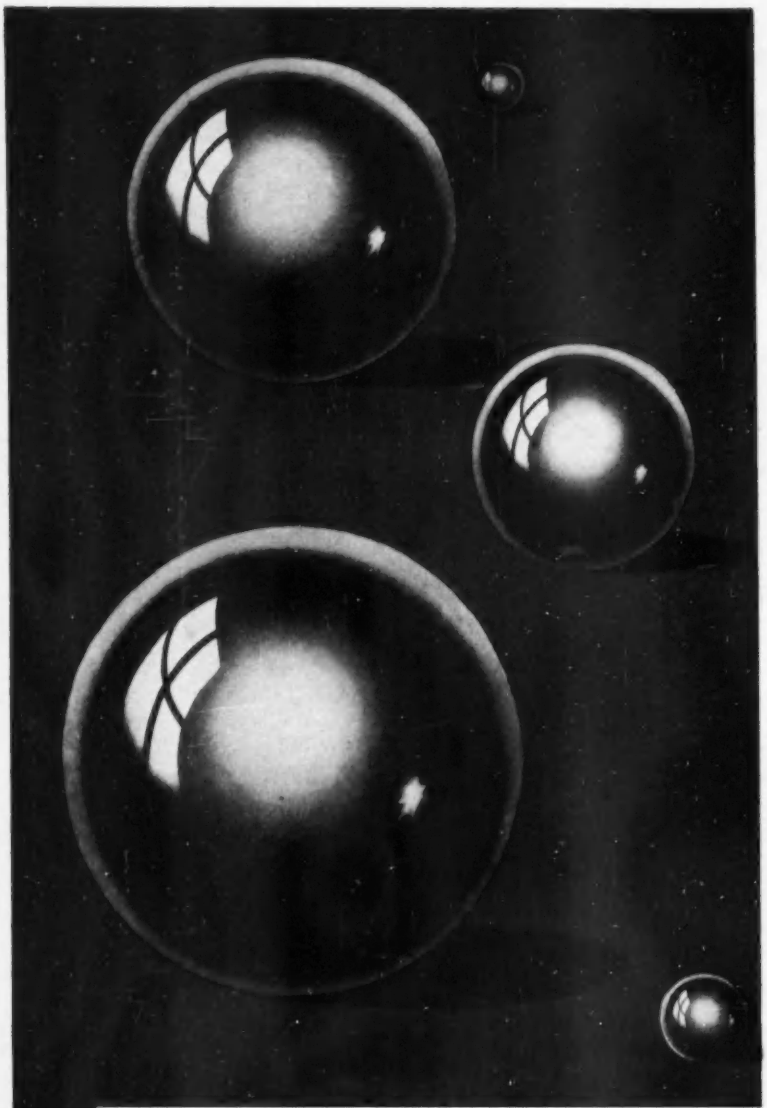
Please write to Henry & Wright, 491 Windsor Street, Hartford, Connecticut.

H&W®

HENRY & WRIGHT

DIVISION OF EMHART MFG. CO.

HARTFORD, CONNECTICUT



Ford Passenger Cars

(*Continued from page* 59)

result from a new chassis, new shock absorber valving, and spring improvements. The ball-joint suspension has been improved by tilting the horizontal axis of the suspension three degrees.

Tubeless tires are again standard equipment.

Power brakes, power steering, four power windows and four-way power seats are optional equipment.

Dual exhausts are standard on all Fairlane V-8 and station wagon models.

An integrated air conditioning and heating system will be introduced early in 1955. The Ford unit will combine a fresh air heater with air conditioner and will be of the "front-end" type with all components forward of the passenger compartment. Controls will be placed in the regular heater control dial on the instrument panel. The unit will be adaptable to station wagons and convertibles.

BOOKS . . .

BIG ENTERPRISE IN A COMPETITIVE SYSTEM, *by A. D. H. Kaplan, published by The Brookings Institution, 722 Jackson Place, Washington 6, D. C. Price, $4.00.* Big business has been reinforced by public behavior and suspect by public opinion for over half a century. Economic theory has stressed the monopolistic aspects of bigness, but few investigations have examined the evidence of the role of big business in the competitive enterprise system. That is the purpose of this volume. It is an orientation book, based on several years of research into the structure and performance of big business. The study reviews both the measures of bigness and the practices of big enterprise. It concludes that we need a more realistic conception of the place of big business in modern society. It also finds that we require a more realistic concept of competition for the guidance of public policy.

PRICE FIXING, CONTROLS, AND ALLOCATION OF NON-FERROUS METALS, *by W. F. Boericke, published by American Enterprise Association, 1012 14th St., N.W., Washington 5, D. C. Price, $1.00.* In this book, the author analyzes what happened when price fixing, controls, and allocations were adopted for a basic U. S. industry—the production and processing of non-ferrous metals. The study is devoted to the problems of the copper, lead, zinc, aluminum, and tin industries, with major attention being given to the first three of these. The author concludes that the unhappy experience with controls of the non-ferrous metals industry is an indictment of Government interference with free markets, except possibly in times of great national emergency. Should controls ever again be contemplated, the findings of his study will have to be seriously considered.

For All Engines . . . this new, low cost, easily assembled hose line for fuel, oil, water, air

AEROQUIP

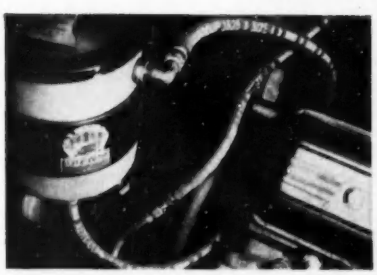
SOCKETLESS

FITTINGS AND HOSE

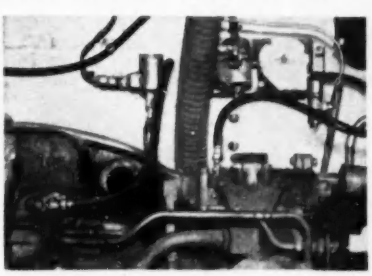
Eliminate the high cost of forming and fitting rigid tubing. Flexible hose lines made with Aeroquip Socketless fittings and hose install quickly, even in confined areas. They withstand heat, cold, shock and vibration encountered in all types of engine operation.

Aeroquip's low cost 1525 hose and Socketless fittings assemble *in seconds.* Just cut the hose to length and push the fittings into the hose . . . the fittings *stay on.* Available in ¼, ⅜, ½, and ⅝" sizes. Write for full information.

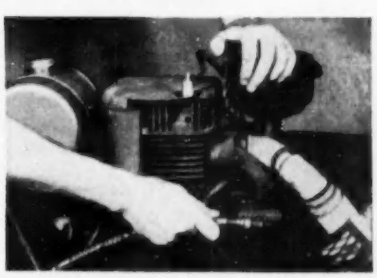
HERE ARE ONLY A FEW TYPICAL ENGINE APPLICATIONS



Aeroquip Socketless fittings and hose were used to make oil filter and fuel lines on this automobile engine.



Socketless fittings and hose were used to make the air unloader line to the O-1 governor on this G.M. coach.



This power mower fuel line points up the ability of Socketless fittings and hose to withstand vibration.

Aeroquip

REG. TRADE MARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

LOCAL REPRESENTATIVES IN PRINCIPAL CITIES IN U.S.A. AND ABROAD • AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

New Process for Forming Passages in Sheet Metal Parts

(*Continued from page* 92)

into the end of the pattern, and the unit is placed between two heavy platens. Hydraulic pressure is applied through the needle to inflate the non-welded pattern. The process is finished by flushing the passageway and finish trimming.

With absolute fusion and complete grain growth, the bond is said to be as strong as the metal. The tubing is self-inspecting by being formed at 3000 to 7000 psi.

Cost reductions of this process occur in tooling and production. New designs of evaporator plates can be made without elaborate tooling. Retooling time is given as one week. Lower end product and production costs are cited, and increased cooling efficiency is provided through the one-piece construction.

A pilot plant has made about 250,000 evaporator plates in the past year. A new plant of some 20,000 tons annual capacity will be in operation at East Alton, Ill., by the end of the year.

STAINLESS fasteners in STOCK

All types and sizes of screws (Phillips, slotted, hex head, socket), bolts, nuts, washers, rivets, keys and pins

Over 9000 items in stock means immediate delivery from one source

New Garden City plant now operating at top speed and quality

Unsurpassed facilities for quantity fabrication of specials

Staff of seasoned engineers always available for consultation

Pioneers in the manufacture of stainless steel fasteners

WRITE NOW FOR FREE COPY OF 96 PAGE FASTENER MANUAL P3

MANUFACTURERS SINCE 1929
ALLMETAL
SCREW PRODUCTS COMPANY, INC.
GARDEN CITY NEW YORK

MEN *in the* NEWS

(*Continued from page* 41)

Ford Div., Ford Motor Co.—**Chase Morsey, Jr.**, has been named manager of the new merchandising and product planning office; **C. F. Goyert**, car planning manager; **David W. Lee**, truck planning manager; **Robert J. Eggert**, manager of business research; and **E. H. Sonnecken**, programming manager.

Vacuum Metals Corp.—**James H. Moore** has been appointed general manager.

Standard Products Co.—**Robert Grant** has been promoted to vice-president of manufacturing; **W. H. Thourlby**, vice-president of sales; and **James M. Hannan**, sales manager.

Dunmore Precision Tools—**Lester J. LaMack** is now sales manager; **George B. McManners**, advertising manager; **Herb Ainsworth**, district sales manager, Detroit office; **James P. Steibel**, manager of research and development; **Logan H. Cashmen**, purchasing agent.

Verson Allsteel Press Co., Service & Parts Div.—**Paul Kjelstrom** has become manager.

Kaydon Engineering Corp., Needle Roller Div.—**John R. Morrow** has been made assistant sales manager.

Capac Industries, Inc.—**C. R. Paton** is now president; **P. C. Russell**, vice-president; **E. H. Anderson**, treasurer; and **John K. Worley**, secretary.

Bendix Aviation Corp., Pacific Div.—**C. D. Perrine, Jr.**, has been appointed director of engineering.

Russell, Burdsall & Ward Bolt & Nut Co.—**Theodore I. Dunn, Jr.**, has been named assistant vice-president of sales, and **James M. Bell** was made Pacific Coast sales manager.

R. M. Hollingshead Corp.—**Harold L. Danziger** has been promoted to group manager in charge of the Automotive, Special Brands, and Universal Divs.

Vickers, Inc.—**Walter V. Scholz** was named application engineer in the El Segundo, Calif., sales office.

(*Turn to page* 166, *please*)

Recording strain in boom of power shovel with Brush Universal Amplifier and Dual-Channel Oscillograph.

WHAT DO YOU WANT TO MEASURE?

Brush Portable Instruments will put it in writing . . . immediately

Recording engine torque with Brush Universal Amplifier and Oscillograph.

You can save hours of engineering time and streamline your testing with Brush Recording Instruments . . . which measure and record stress, strain, vibration, pressure, torque, electrical characteristics and many other variables. Chart records, which eliminate laborious plotting, are produced instantaneously. The charts permit quick visual examination and also provide a permanent record of tests.

Brush offers a complete line of amplifiers, oscillographs and "packaged" analyzers for specific measurement jobs. You can record a single channel of data, or up to six channels simultaneously. You have a choice of direct-inking or combination ink and electric-writing oscillographs. Units are all designed for portability and rugged use.

For complete information call your nearby Brush representative, or write Brush Electronics Company, Dept. DD-11, 3405 Perkins Avenue, Cleveland 14, Ohio. In Canada: A. C. Wickman, Ltd., Toronto.

BRUSH ELECTRONICS COMPANY

INDUSTRIAL AND RESEARCH INSTRUMENTS
PIEZO-ELECTRIC MATERIALS • ACOUSTIC DEVICES
MAGNETIC RECORDING EQUIPMENT
ULTRASONIC EQUIPMENT

formerly The Brush Development Co.
Brush Electronics Company is an operating unit of Clevite Corporation.

Now! The world's

RED

Eliminates installation

This bright colored Redicoat coating is available on any metal encased National seal. Together with the ground circumference standard on National Oil Seals, Redicoat offers the most perfect and economical metal-to-metal bore sealing available.

© 1954
National Motor
Bearing Co., Inc.

Figure 1. Cross section shows Redicoat seal installed in housing. Radial or circumferential scratches as deep as .003" are filled completely. Bore is sealed as Redicoat seal is installed; no drying or "setting" is required.

first pre-cemented oil seal!

ICOAT OIL SEALS

TRADE MARK

cementing—offers important economies on your production line

Now you can install press fit oil seals that insure a perfect, enduring seal between oil seal and bore as well as oil seal and shaft. You can eliminate danger of cement reaching and damaging sealing surfaces, and you can *completely eliminate cost of cementing on your production line.*

Amazing new National Redicoat is applied at NMB factories. Seals reach you pre-cemented smoothly and evenly all around the circumference of the outer case. The truly negligible additional cost of Redicoat is more than made up by your very real savings in assembly time and materials.

What is Redicoat?

National Redicoat is a material developed and applied by, and available only from, National Motor Bearing. It is dry to the touch, does not pick up dirt, and does not adhere to other seals or containers. It also prevents rust on the area covered.

Upon installation, a microscopic portion of the coating rolls up at the bore's edge (Figure 1) but the majority remains as a tough, stable cement filling all irregularities in the housing bore. Redicoat will last indefinitely even at temperatures −65° to +350° F. The fit is even more perfect than metal-to-metal with a ground outer case surface (as on all regular National seals). Seals may be removed easily, even after prolonged service at 300° F. No special preparations are needed for installation, and no tedious cleaning of the housing bore is required when Redicoat seals are removed and new seals installed.

NATIONAL OIL & GREASE SEALS O-RINGS SHIMS

NATIONAL MOTOR BEARING CO., INC.
General Offices: Redwood City, Calif.
Plants: Redwood City, Calif.; Van Wert, Ohio

NATIONAL MOTOR BEARING Co., Inc., Dept. D
Broadway at National, Redwood City, California

Gentlemen: Please send information on **Redicoat Oil Seals** as applied to _____ (Type of Product)

Name _____

Company _____

Street _____

City _____ Zone _____ State _____

PROBLEM

BUILD A CONVEYOR TO CARRY A 10,000 LB. HULL

ANSWER

Allis-Chalmers Mfg. Company at its LaPorte, Indiana Works required a conveyor which would carry a 10,000 lb. combat cargo-carrier hull through both the painting and finishing operation.

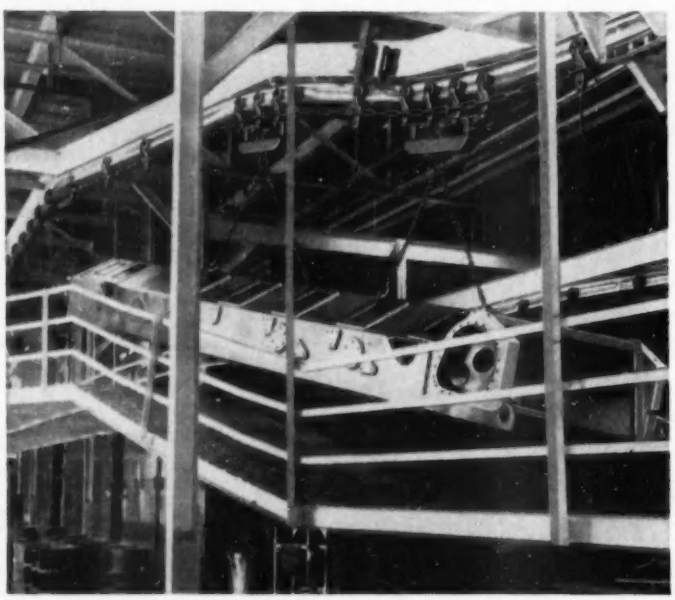
Planet Corporation engineered, designed, and installed the trolley conveyor pictured below which made use of Allis-Chalmers' existing plant facilities.

The Planet X-678 Trolley Conveyor has 6" trolley wheels which run on a 7" I-Beam track, capped with a 12" I-Beam. Because of the tremendous load, the installation is floor supported.

Special load bars, run-away dogs, take-ups, and drives were required, and a safety guard erected capable of withstanding the impact of a falling hull.

Planet also designed and installed additional conveyors to carry the hull through final assembly, as well as the conveyors used on the engine assembly line.

Here's another example of why it pays to "Plan with Planet". If you have need of "automated" equipment to solve a particular production problem why not consult Planet Corporation? *Write today.*



Planet trolley conveyor carrying 10,000 lb. combat-vehicle hull.

WRITE FOR CATALOG

PLANET CORPORATION

1822 SUNSET AVENUE
LANSING, MICHIGAN

- CONVEYORS
- ENGINEERED SYSTEMS
- FOUNDRY EQUIPMENT
- AUTOMATION
- STEEL FABRICATION

News of the MACHINERY INDUSTRIES

(*Continued from page 79*)

Efficient will be able to build press tools up to 25 tons in weight, whereas capacity of the present facilities is 15 tons. The new try-out equipment will handle draw dies up to 148 in. long as against the 104 in. present capacity.

Equipment in the new plant will include a double-action press—84 in. by 136 in. bed area, 90 in. shut height, 650 tons on the 34 in. stroke ram, 450 tons on the 26 in. stroke blankholder. The largest single-action press will have 84 in. by 148 in. bed area, 60 in. shut height, 450 ton capacity with a 24 in. stroke, 120 tons on the air cushion. A new special hydraulic die spotting press will have a 60 in. by 150 in. bed area, 60 in. shut height, and 400 tons capacity. Keller and other equipment will be installed to enable Efficient to handle any job straight through from loft or mockup to final tryout.

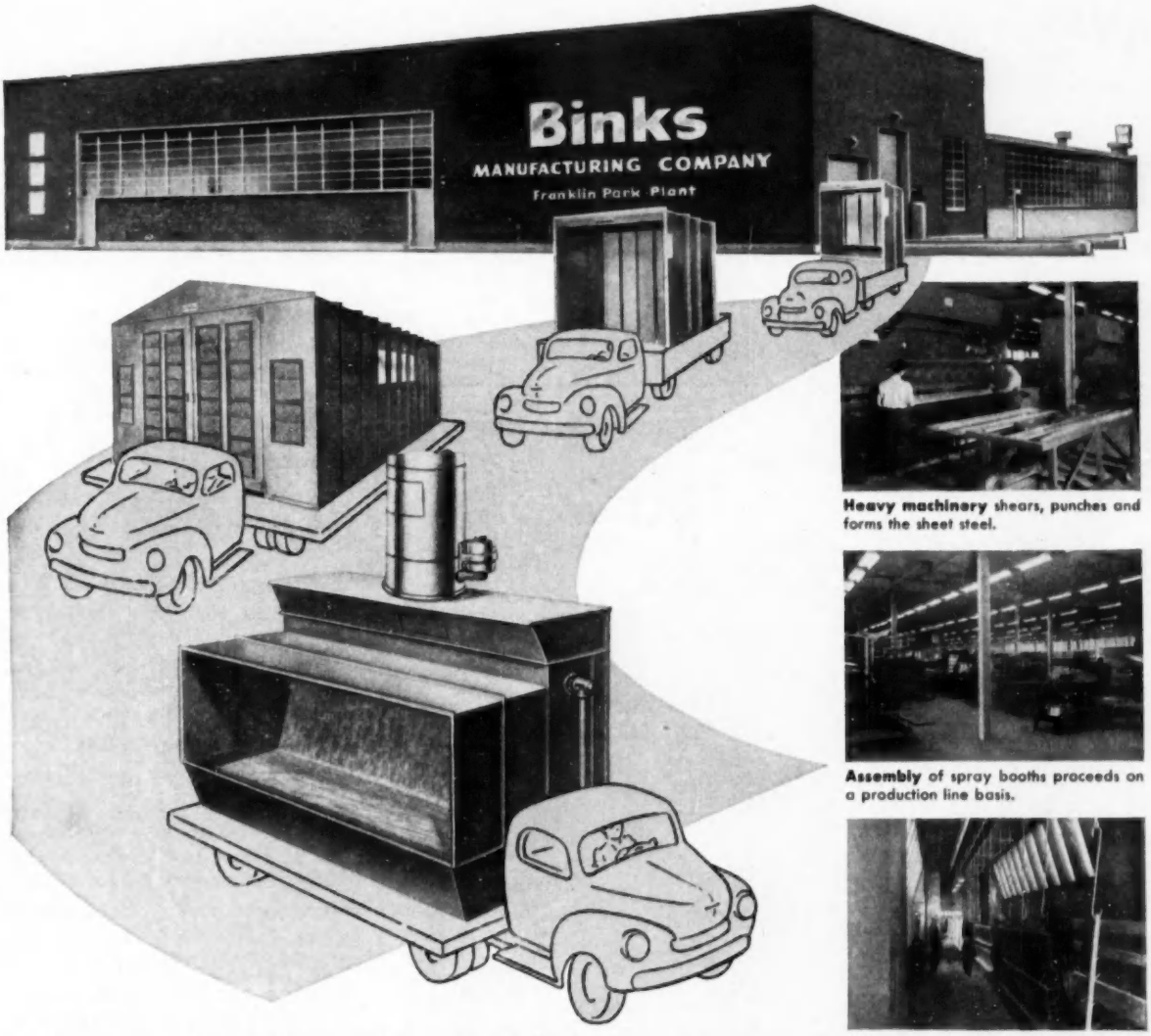
Ex-Cell-O Finances Excel

The final ratings in the *Financial World* survey of annual reports, Ex-Cell-O Corp. was judged as having the best annual report of the machine tool industry for the fourth year. A total of 5000 annual reports were considered in the international competition. These were judged in 100 industrial classifications for the best of industry awards. In the machine tool industry, Bullard Co. was runner up for top honors.

Continental's Fiftieth

The Continental Screw Machine Co., New Bedford, Mass., is currently celebrating its golden anniversary. An open house was held in conjunction with the anniversary activities.

Readers of
AUTOMOTIVE INDUSTRIES
are always well informed



Heavy machinery shears, punches and forms the sheet steel.

Assembly of spray booths proceeds on a production line basis.

All parts are painted in latest conveyorized spray booth.

Ample loading docks and mechanical handling equipment speeds delivery.

Streamlined production brings you BETTER SPRAY BOOTHS at a real saving!

Today, you can have the most efficient spray booths on the market at a price no more than ordinary equipment...and sometimes for even less. This is possible because Binks engineers have improved and *standardized* the design of spray booths. Standard parts are assembled to provide high efficiency booths that will meet any requirements. These parts are mass produced in Binks' new Franklin Park Plant...quickly, precisely and economically. And that's why you can buy BINKS approved Spray Booths now...and actually save money.

Binks
EVERYTHING FOR SPRAY PAINTING

Write today
for our NEW 956 Catalog.

It will tell you all about the many models of spray booths available . . . will help you pick the right equipment for your use.

Binks Manufacturing Company
3120-30 Carroll Ave. West, Chicago 12, Ill.

Send me a copy of your NEW 956 Catalog. I am interested in your complete line of standard Spray Painting Booths.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

MEN *in the* NEWS

(*Continued from page* 160)

Control Products, Inc.—**Arthur W. King** is now sales manager.

Minneapolis - Honeywell Regulator Co., Valve Div.—**Ralph A. Rockwell** has been appointed chief engineer.

Chrysler Corp.—**F. K. Dell** has been made Kansas City regional manager.

J. H. Williams & Co.—**Jack C. Malugen,** president, was named head of the Service Tools Institute.

Youngstown Sheet & Tube Co. — **John M. Tuthill** has been appointed general of sales.

Jones & Laughlin Steel Corp. — **Rynald L. Hugo** has been appointed sales engineer, cold finished products.

Gar Wood Industries, Inc.—**C. W. Snider** has been named assistant to the director of sales.

Vickers, Inc.—Owen C. Davis has been made controller.

Hartford Steel Ball Co.—**Robert D. Sterling** has been made factory manager.

Marquardt Aircraft Co.—**John A. Drake** was chosen director of long range planning and research programs, and **John S. Winter** was promoted to chief engineer for powerplants.

Nut Corp. of America—**Philip V. Tarr** was named chief engineer and secretary.

Cold Metal Products Co.—**William F. Zarbaugh** was appointed a vice-president.

Norton Co.—**Cheever H. Ely** has been made Cleveland district manager replacing **Fred P. Hays,** retired.

Pacific Tire & Rubber Co.—**T. G. Liljenwall** has become general sales manager.

General Electric Co.—**W. J. Kinsey** is now sales manager of engine controls for Aircraft Products Dept.

Metalphoto Corp. — **Robert A. Kempe** has been named vice-president, treasurer, and general manager.

Carborundum Co.—**George J. Zimmerman** has been appointed staff assistant for management controls.

Lockheed Aircraft Corp., Missile Systems Div.—**Dr. Sydney H. Browne** has been named superintendent of the Analytical Dept., Engineering Branch; **C. R. Bumstead,** manager of Engineering Laboratories Dept.; **R. O. Wickersham,** manager of Military Requirements Dept. and Military Liaison Dept.; and **Robert W. Brenneman,** manager, Plant Engineering Dept.

Com-Air Products, Inc.—**William S. Oman** is now director of sales.

Allison Div., General Motors Corp. —**K. J. Bigelow** has been named manager of the Dayton, O., zone office.

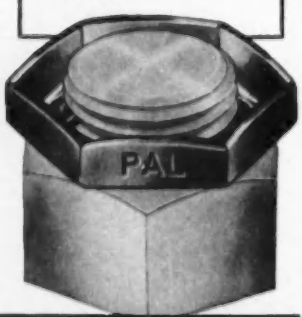
Bendix Aviation Corp.—**James P. Buckley** has been named regional sales manager on the West Coast for four divisions.

Aero Supply & Mfg. Co., Inc.— **J. Leslie Lenton** was made plant manager.

(*Turn to page* 170, *please*)

How FRUEHAUF TRAILERS assure Vibration-proof assemblies with PALNUT Lock Nuts

Fruehauf Trailers have used PALNUT Lock Nuts for years to lock many critical assemblies against vibration. Present applications are on radius rod retainers in spring hangers (shown), torsion tandem frame hanger brackets, tire carrier basket and universal connection mounting brackets.



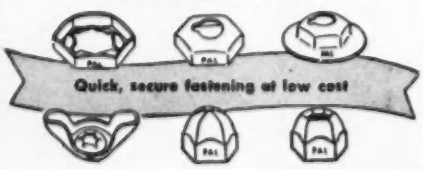
Regular Type PALNUT TRADEMARK LOCK NUTS

Many advantages of PALNUT Lock Nuts

• Absolute security • Lower cost • Fast assembly with hand or power tools • Space saving • Maximum bolt loading • May be removed and re-used • Withstand high temperatures.

Regular Type PALNUT Lock Nuts are used by the automotive industry on connecting rods, main bearings, engine mountings, shock absorber mountings, body hold down, brake parts, transmission housing, exhaust manifolds, etc. Send for free samples and Bulletin #577.

THE PALNUT CO., 60 Cordier St., Irvington 11, N. J.
Detroit Office and Warehouse:
730 West Eight Mile Road



For gasketed parts like these . . .

This FREE BOOK CAN HELP YOU CUT COSTS!

There's something new in this year's cars . . .

IT'S THE DAREX Flowed-in GASKET PROCESS!

And this fact-filled brochure gives you the whole Flowed-in Gasket Story. Here are a few samples of the things you'll read in this informative new book:

ABOUT COSTS

Using the DAREX Flowed-in Gasket Process, a major manufacturer is saving $50,000 per year in labor and materials on a single gasketing operation. As a result of this striking cost reduction, the firm has recommended the DAREX Process for several more gasketing operations.

ABOUT THE PROCESS

The Flowed-in Gasket Process is a new application of a method of sealing developed by Dewey and Almy researchers over 30 years ago, and successfully used in food container manufacture ever since.

The DAREX Flowed-in Gasket Process is more than a sealing compound . . . more than a machine . . . more than an engineering service . . . *it's a complete Process!* So when you switch to Flowed-in Gaskets, you get all three.

Compounds— Over 800 formulations available to meet most needs. Or Dewey and Almy chemists will develop a "job-tailored" compound for you.

Machines— To apply the compound, Dewey and Almy designs and builds machines based on more than 30 years' field experience.

Service— Every machine is precisely adjusted to your specifications before it leaves the shop. When it arrives, a Dewey and Almy Engineer is on hand to install and adjust the machine. Then he trains your operators to full proficiency. And whenever you need him, the Dewey and Almy Man is at your service.

DEWEY and ALMY
Chemical Company
Cambridge 40, Mass.

Offices or subsidiaries in Buenos Aires, Chicago, Copenhagen, London, Melbourne, Milan, Montevideo, Montreal, Naples, Paris, San Leandro (Calif.), Sao Paulo, Tokyo.

Discover what DAREX "Flowed-in" GASKETS can do for YOU

MAIL THE COUPON TODAY!

DEWEY and ALMY Chemical Company
Dept. A-11
Cambridge 40, Mass.

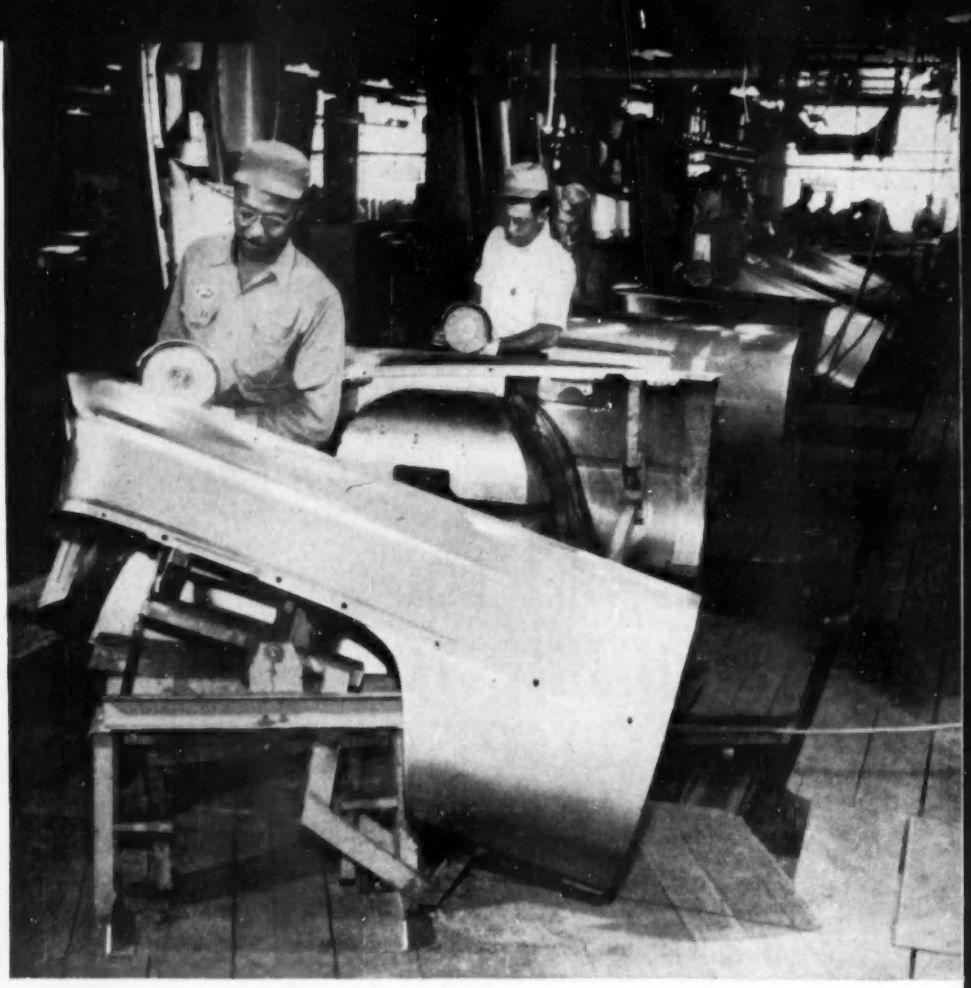
Please send me the new DAREX Flowed-in GASKET Book.

Name.....

Firm.....

Street.....

City.....State.....



Down This Production Line come some of America's most beautiful fenders. It is one of many places in industry . . .

Where Steel Becomes Curvaceous

To achieve the sleek, graceful lines of today's modern automobiles demands the ultimate in technical skills and quality materials. Take, for example, the process of cold-forming a front fender from cold rolled sheet steel supplied by Pittsburgh Steel Company.

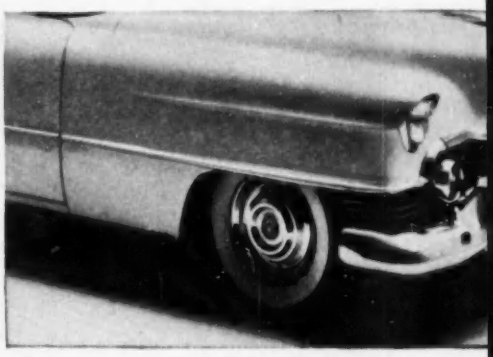
This precise process is possible only when the steel has the proper internal and external qualities that let it flow evenly and true to form

A Fender starts with a flat sheet of cold rolled steel. Each sheet is blanked into a fender-sized panel.

Formed on this 750-ton drawing press, the cold steel panel flows under tremendous pressure to the contour of a fender.

Trimmed to exact size, the fender is scrutinized for any surface defects that may have resulted from the severe drawing.

Welded to the front of the fender is a segment that will hold the headlight. The surface of the weld is then ground off to perfect fender contour.



Quality of the steel and of the fender made from it gives beauty and style where quality counts most.

under tremendous pressure of deep drawing dies. The sheets must be uniform—sheet after sheet.

• **How Is This Possible?**—Good internal quality of the steel, proper chemical analysis, elimination of inclusions in the steel, control of grain structure—prevent stretcher strains from appearing in the surface of the fender. It prevents lamination, seams, rough grainy surface and even tears and breaks in the steel.

The surface of the steel must be free of external defects and its thickness controlled to within a few thousandths of an inch to work properly to the exacting limits of the dies. This assures even flow of the steel to all parts of the dies—prevents wrinkles — prolongs the life of the die.

The steel must have good weldability. As the process continues, the headlight retainer is welded on. Then the dust shield, mounting and reinforcing brackets are installed and it goes to the finishing line.

Metal finishing is the final test of perfection. Here the surface is filed, disc ground and polished. Yet it must retain a finish that is free from swirls, high or low spots, or skin peel.

• **Good Steel Pays**—When you consider these facts, it is easy to understand why automakers who insist on top quality steel buy from Pittsburgh Steel Company.

They know that a four-year, $65-million modernization program has improved facilities in every department and provided steel of sound inherent qualities to be rolled on brand new hot and cold rolled sheet mills. These mills are equipped with the latest technological advances to give the highest scientific accuracy in the control of sheet thickness and shape.

The extra attention to quality at Pittsburgh Steel gives you cold rolled sheet that makes possible higher yield and fewer rejections on your production lines. It makes possible longer die life, less finishing and at the same time improves the quality of your product.

If you want to know more about this new opportunity for savings that result from top quality sheet steel at competitive prices, ask to have a Pittsburgh Steel salesman call. You will enjoy the prompt personal service he will offer.

A copy of the color brochure "The New Pittsburgh Steel Company" is yours for the asking.

"Everything New But The Name"

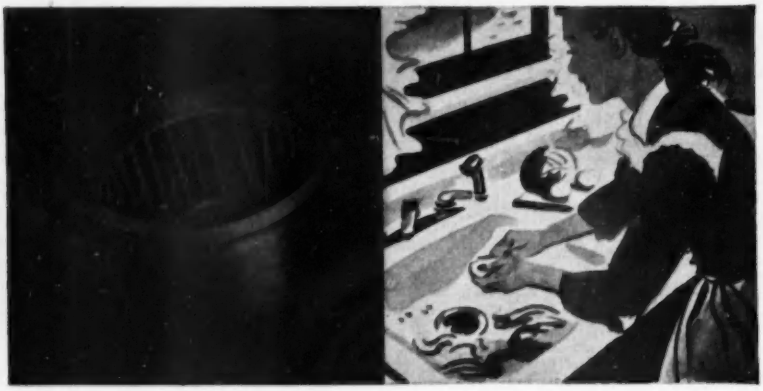
Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

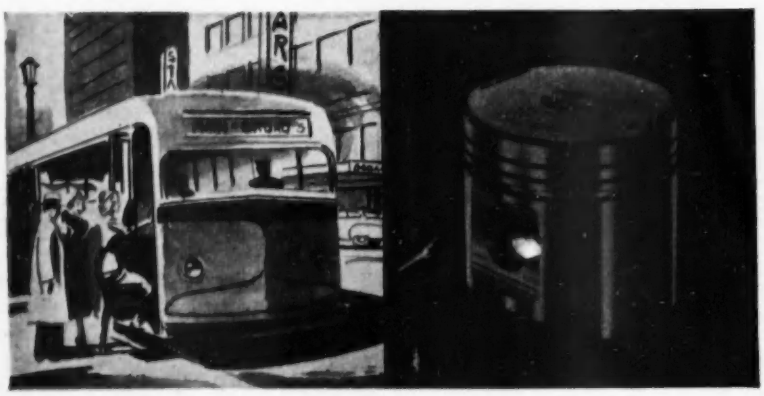
DISTRICT SALES OFFICES: Atlanta • Chicago • Cleveland • Columbus • Dallas • Dayton • Detroit Houston • Los Angeles • New York • Philadelphia • Pittsburgh • San Francisco • Tulsa • Warren, Ohio.

PLANTS: Monessen, Pa. • Allenport, Pa. • Akron • Los Angeles • Unionville, Conn. • Warren, Ohio • Worcester, Mass.

PRINCIPAL PRODUCTS: Hot and Cold Rolled Strip and Sheets • Strip Specialties • Seamless Tubular Products • Wire and Wire Products • Chain-Link Fence • Cargotainers • Steeltex



Garbage Disposers and Buses



Thompson Precision-Engineers Light Metal Castings for All Industry

A HOUSEWIFE using her garbage disposer unit and a bus driver threading his way through traffic have one thing in common—both count on Thompson. The garbage disposer unit and the bus are each improved by precision-engineered castings made by Thompson's versatile Light Metals Division.

The housewife's garbage disposer uses several parts manufactured by Thompson, including the housing—the bus uses several precision-engineered parts, including pistons.

Garbage disposer housings and bus engine pistons are but two of the many light, strong, durable castings designed, developed and manufactured by Thompson for a long list of diversified customer uses. Today Thompson is producing light metal castings for such products as washing machines and jet planes, outboard motors and tractors, automobiles and industrial engines; ice scoops and aircraft engines.

Behind this ability to aid all forms of industry are over 50 years experience in research and manufacture of precision metal parts. Regardless of your product, if you use castings, Thompson's creative engineers will gladly show you where and how you can simplify your operations and save on costs with Thompson Light Metals Castings.

For a detailed description of the Thompson Light Metals facilities which are available to you, send for your free copy of "Creative Castings." Just write to Dept. AI-7, Light Metals Division, Thompson Products, Inc., 2269 Ashland Road, Cleveland 3, Ohio.

You can count on Thompson Products

LIGHT METALS DIVISION
2269 Ashland Rd. • Cleveland 3, Ohio

MEN *in the* NEWS

(*Continued from page* 166)

Simmons Fastener Corp.—Harry H. Rose has been elected vice-president and director.

R. M. Hollingshead Corp.—**Walter S. Pollard** and **James W. Coffman** are now supervisor of advertising programs, and supervisor of sales promotion and sales training, respectively.

Fairchild Engine & Airplane Corp., Aircraft Div.—**L. R. Hackney** has become administrative assistant to the general manager.

Michigan Abrasive Co.—**James C. Brown** is now chief chemist.

Lockheed Aircraft Corp., Georgia Div.—**R. J. Sorenson** is now staff engineer in charge of all electrical and electronic work, and **J. E. York** has been made manager of the Structural Dept.

Convair Div., General Dynamics Corp.—**Richard K. Waldo** has been appointed manager of the market research section of the Commercial Sales Dept.

U. S. Spring & Bumper Co.—**John R. Rauen, Sr.,** has been named chairman of the board; **W. S. Rheem,** president; and **Frank G. Fisher,** vice-president and general manager.

Gar Wood Industries—**R. F. Whitworth** was appointed assistant director of sales, branch operations.

Temco Aircraft Corp.—**Robert Eis** has been named chief inspector over 13 departments at the Dallas, Texas, plant.

Seiberling Rubber Co.—**Orrin K. Feikert** has become manager of the Truck Tire Sales Dept., and **Frank G. Hager** has been made assistant manager.

Steel Improvement & Forge Co.—**George D. Gotschall** has become manager of the new Research and Development Dept.

Wayne Works, Inc.—**Holmes Collins, Jr.,** is now purchasing agent.

Consolidated Engineering Corp.—**Henry Salvatori has** been elected to the board of directors.

(*Turn to page* 172, *please*)

NAME YOUR NEED

COATED FIBROUS MATERIALS MAY BE BEST ANSWER

Like to take advantage of the economies of fiber boards, but feel they are too limited electrically or physically for your needs? Take a look at our coated DUROIDS.

You'd have to go to laminates to get a lower rate of moisture pick-up. Flexural strength is greatly improved. Appearance-wise, coated DUROIDS are slick, smooth and shiny.

One user, interested in improved arc resistance for a low voltage application, tested DUROID 800 with an epoxy coating. Result: our material showed no sign of failure after a test period 2000 cycles longer than the point at which the next best material (fiber board on laminated phenolic) had broken down.

We are equipped to coat our DUROIDS to your specific requirements, using a wide range of surfaces, including epoxies, vinyls, alkyds, etc. Name your need — coated DUROIDS may be the best and lowest cost solution.

Write Dept. A for engineering data and appearance samples

ROGERS CORPORATION

ROGERS, CONNECTICUT

PRODUCTS

DUROIDS — for Gaskets, Filters, Electronic Devices, etc.
ELECTRICAL INSULATION — for Motors, Transformers, Generators, etc.
SHOE MATERIALS — for Counters, Midsoles, Liners, etc.
PLASTICS — Special Purpose Molding Compounds and Laminates

SERVICES

Research, Development, and Engineering of New Materials, Parts and Products • Fabricating, Combining, Coating, & Embossing

MEN *in the* NEWS

(*Continued from page* 170)

Temco Aircraft Corp.—**E. Fred Buehring** has been named plant manager of the aircraft overhaul and modification center at Greenville, Tex.

Clevite Corp.—**John W. Dixon** was named vice-president in charge of coordination of research and new product development.

Standard Piezo Co.—**Lawrence J. Straw** was made general sales manager.

E. W. Bliss Co.—**James C. Keney** is now a member of the sales staff of the Chicago district office.

Wesson Co.—**Paul H. Miller** has been appointed to the Research & Development Staff.

Chicago Auto Parts, Inc.—**Fred Furth** is now general manager, while **Fred Hochberg** is assistant general manager.

Ryerson Steel Co.—**C. Nelson Wetherell** has been chosen manager of training and education, and **Richard J. Oetking** has been named office manager of the Chicago plant.

National Vulcanized Fibre Co.—**Henry C. Guhl** has been named manager of process engineering.

Gothard Mfg. Co.—**William A. Gothard** is now president and general manager.

Greer Hydraulics, Inc.—**Nicholas N. Solovioff** has been named to the operational staff to head the Production Engineering Dept.

Landers Corp.—**John P. Howland** has been made executive vice-president; **James L. Davison**, general sales manager; and **William W. Brown**, assistant general sales manager.

General Box Co.—**Thomas W. Regan** has been appointed sales manager.

Chrysler Corp.—**Donald A. Milton** is now manager of the Product Cost Control Dept.

Lockheed Aircraft Corp.—**Dr. Charles T. Molloy** has been named staff engineer for acoustics.

Brown Instruments Div., Minneapolis-Honeywell Regulator Co.—**John H. Hagen** has been appointed director of industrial relations.

Marquardt Aircraft Co.—**Robert L. Earle** was named vice-president for administration and assistant to the president.

Bellofram Corp.—**James C. Walton** was named a director and vice-president in charge of production.

Thermoid Co., Industrial Rubber Div.—**Robert Keach** was named manager.

Hydro-Aire, Inc.—**Robert J. Trivison** was chosen production manager.

Pennsylvania Salt Manufacturing Co.—**Vance N. Wilson** has been appointed manager of the new plant at Chicago Heights, Ill.

Titanium Metals Corp. of America—**Jules F. Boand, Jr.**, has been named Pacific Coast manager of sales and technical service.

Chrysler Corp.—**Walter J. Jones** was made operating manager of the San Leandro, Calif., plant.

Parker Appliance Co.—**Robert H. Davies** was named vice-president in charge of engineering.

(*Turn to page* 174, *please*)

SHIPPING CONTAINERS

Just what does the identifying SUPERSTRONG trade mark convey to the packaging expert?

..SUPERSTRONG means a century of experience in packaging design and construction.

..SUPERSTRONG means assured service through strategically located plants, and of controlled quality through ownership of all operations.

..SUPERSTRONG means diversity through manufacture of virtually every type of corrugated, wirebound or wooden container.

..SUPERSTRONG means sound engineering design and construction.

Be sure—specify SUPERSTRONG.

WIREBOUND

WOODEN

RATHBORNE, HAIR and RIDGWAY BOX CO.
1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS

NEW Viscasil

HIGH-VISCOSITY SILICONE FLUIDS

FOR NEW IDEAS IN PRODUCT DESIGN

Rate-measuring gyroscope, type K, courtesy Doelcam Corporation

Torsional vibration damper, courtesy Houdaille-Hershey Corporation

IDEAL FOR DAMPING!

Their flat viscosity-temperature curve, stability at elevated temperatures, nearly Newtonian viscosity characteristics and ability to resist breakdown under continual high-shearing stresses make G-E Viscasil fluids ideal for all kinds of viscous dampers.

EVALUATE G-E VISCASIL FLUIDS NOW!

Now is the time to begin *your* evaluations of these new fluids. They are destined to revolutionize many current design concepts. Through them *you* may achieve simplified designs, increased product reliability and performance—even *new* products never possible before. As you "imagineer" with them, remember to free your thinking from the design limitations imposed by conventional materials. *G-E Viscasil fluids often dictate the design!*

G-E silicones fit in your future

GENERAL ELECTRIC

General Electric's new Viscasil fluids offer tremendous potential for *new* product design and *present* product improvement because of this unusual combination of properties:

- **Relatively small change in viscosity over a wide temperature range**
- **Outstanding heat resistance**
- **Outstanding resistance to shear breakdown**
- **Unusual chemical inertness and stability**
- **Compressibility — far greater than other fluids**

Available in viscosities from 1,000 to 100,000 or more centistokes, these versatile silicone fluids are ideal for such applications as:

Torsional vibration dampers

Dashpot dampers **Shock absorbers**

Fluid couplings **Servo mechanisms**

Electrical, release, pharmaceutical and cosmetic applications

CLIP AND MAIL TODAY!

General Electric Company
Section 1461-1C
Waterford, New York

Please send me product data on G-E Viscasil fluids. I want this for ( ) Reference purposes only ( ) An immediate application on_____

_____

Name_____ Position_____

Firm_____

Street_____

City_____ Zone___ State_____

IN CANADA: Mail to Canadian General Electric Company, Ltd., Toronto

made by
MASTER CRAFTSMEN
to insure
Matchless Performance

Under the Hood
or
Under the Chassis
Specify
AIRTEX
PRODUCTS

WATER PUMPS
Lifetime-lubricated bearings. Patented long-life seals. Vacuum-tested.

FUEL PUMPS
Single and dual types with genuine Nuprene diaphragm, patented valve cage assembly, long-wearing rocker-arm and linkage.

TIE ROD ENDS
Four ways better! Rolled Threads, Phosphor Bronze Seat, Patented Ball Bearing Construction, Neoprene Washer and Dust Shield.

OTHER AIRTEX QUALITY PRODUCTS
Front End Suspension Parts • King Bolt Sets • Front Wheel Bearings
Hydraulic Brake Parts • Hydraulic Brake Hose • Stop Lite Switches
Fuel Pumps Parts and Distributors

AIRTEX PRODUCTS INC.
FAIRFIELD, ILLINOIS

MEN *in the* NEWS

(*Continued from page* 172)

Trailmobile, Inc.—**Jack R. Kruizenga** was made national used trailer manager.

Goodyear Aircraft Corp. — **Albert W. Cook** has been named chief project engineer; **Donald G. Smellie**, head of the research and development section; and **Charles F. Luginbill**, placed in charge of all testing activities and laboratory operations within the Aircraft Wheel & Brake Development Dept.

Dunlop Tire & Rubber Corp.—**Carl J. McNally** has been named manager of the Buffalo Sales Div., and **Lester Hill** is now southeast regional sales manager.

Chandeysson Electric Co., Motor-Generator Div.—**Robert A. Embree** has been appointed process and plant engineer.

Camcar Screw & Mfg. Corp.—**John G. Gregory** is now New England representative, while **James A. Clarkson** has become Northern Illinois representative.

Delman Co.—**Robert Anderson** has been promoted to **manager of the** new windshield washer plant.

Garrett Corp.—**Myron A. Tracy** has been selected as manager of the Washington, D. C., office, while **Robert D. Shoenhair** was made assistant manager.

South Chester Tube Co.—**W. C. Hale, Jr.** has been elected executive vice-president.

Parker Appliance Co.—**Frank A. Depatie** has been moved to Detroit to direct rubber product sales in Michigan.

Standard Products Co.—**Charles C. Hammer** was promoted to treasurer, and **John D. Drinko** was made secretary.

Mycalex Corp. of America—**Richard A. Humphrey** has become chief of research and development at the Clifton, N. J., plant.

Peters Stamping Co.—**George J. Edellstein** has been elected vice president.

Zim Mfg. Co.—**Charles W. Zimmerman**, vice-president, has been elected director for a three-year term of the Motor & Equipment Manufacturers' Association.

Model PO
Air-Actuated
CLUTCHES

provide

REMOTE CONTROL without complicated linkage.

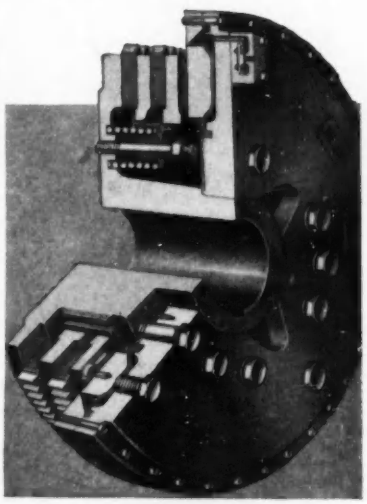
HIGHER TORQUE CAPACITY (with slippage capacities up to 120,000 lbs. ft.).

LESS WEIGHT, NARROWER WIDTH —permitting more compact installations with lower initial costs, and use of air-actuated clutches where drum or band-style clutches previously have been used.

FASTER, SMOOTHER OPERATION with positive air-sealing under all conditions; featuring fully-supported, no-stretch construction . . . extra-long stroke, and controlled flexing is provided by the exclusive Twin Disc diaphragm.

POSITIVE, QUICK RELEASE . . . no seal-drag . . . built in pressure release valves.

INVESTIGATE Twin Disc Model PO Air-Actuated Clutches for designing into new equipment, or for modernizing older models . . . *write today for new Bulletin 304!*



TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
TWIN DISC

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin
Hydraulic Division, Rockford, Illinois

Same as PUTTING MONEY IN THE BANK!

Standard X-WASHERS

Save
- PRODUCTION TIME
- PRODUCTION COSTS
- PRODUCTION FAILURES

FREDDIE FASTENER TALKIN': We can provide grooved pins for all sizes of STANDARD X-WASHERS . . . parallel or headed type pins made to specifications. Send print . . . or write for X-WASHER catalog and order by number. You'll receive a prompt quotation.

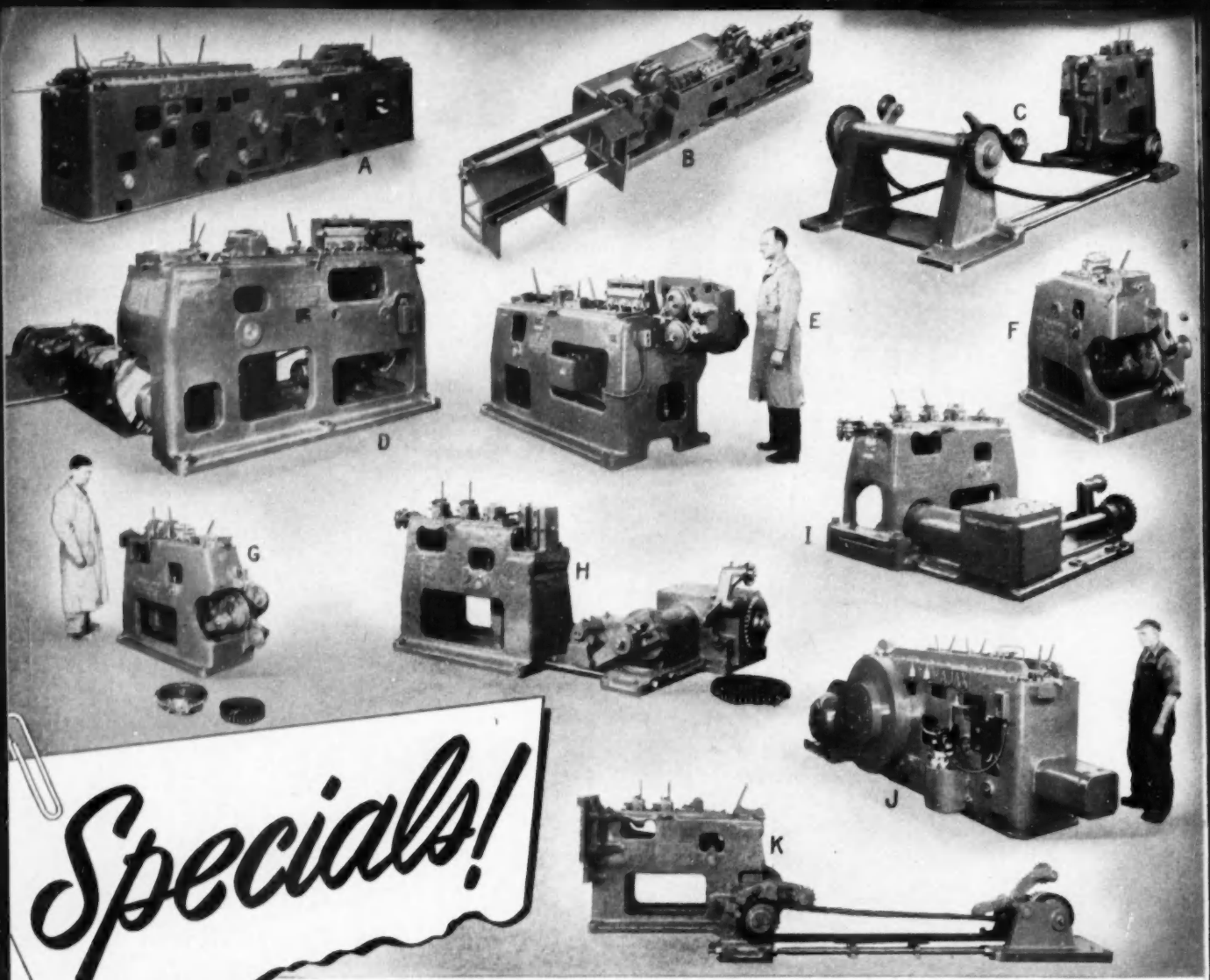
Write today for your Standard X-Washer catalog, c/o Dept. A-11.

● Designers of products ranging from wheel chairs to airplanes rely on STANDARD X-WASHERS . . . the *profitable* solution to almost every fastener problem.

This simple locking device is inexpensive, safe, and efficient. Especially designed to hold pins and small shafts firmly in position, the STANDARD X-WASHER completely eliminates the need for outmoded castellated nuts, cotter pins, and lockwire. No *special* tools are required. A pair of ordinary pliers clamps the STANDARD X-WASHER to a tight 360° enclosure in a jiffy, speeding up the work on the assembly line.

For the *complete* story on the new-type fastener with the thousand and one applications, send for the illustrated STANDARD X-WASHER catalog. Start saving money for your company by "designing-in" STANDARD X-WASHERS.

STANDARD Locknut and Lockwasher, Inc.
2250-56 VALLEY AVE. • INDIANAPOLIS 18, INDIANA



Specials!

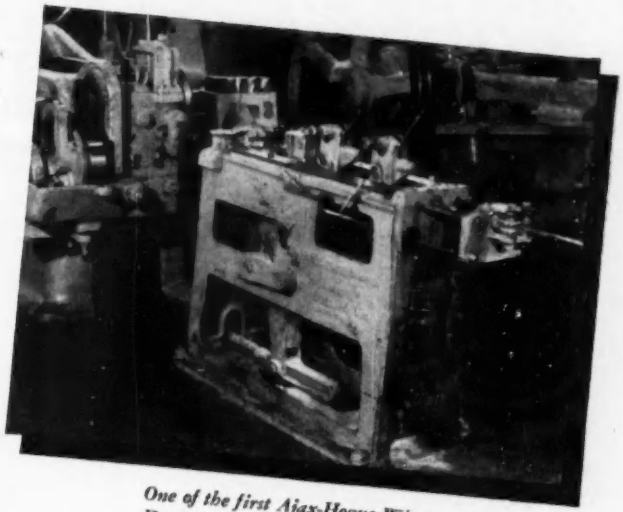
In addition to a complete line of standard wire drawing and bar drawing machines, Ajax designs and manufactures special drawers to meet a wide variety of special requirements. Whether the need is for round, square, hex., keystone or rectangular section stock to close tolerances or whether the drawer is to be used in conjunction with cold headers, presses or special machines, Ajax can build it to meet the requirements and at a cost consistently low for the size and quality of the machine produced. If you have a need for drawing ferrous metals from 1010 to 52100 or non-ferrous metals with enough hardness to permit gripping, which is beyond the range of one of our standard drawers our engineers will be glad to discuss your particular requirement with you. We will be glad to send further information.

- **A** Bar Drawing and Straightening Machine
- **B** Drawing, Straightening and Cutting off Machine
- **C** for Drawing Keystone Stock
- **D** for large Waterbury-Farrel Nut Machine
- **E** for ½" Nut Machine
- **F** for ¼" Waterbury Header
- **G** for ⅜" Waterbury Header
- **H** for No. 5½ Minster Press
- **I** for Double End Spoke Header
- **J** Continuous Drawing Machine
- **K** for ⅝" Bolt Maker

THE *Ajax* MANUFACTURING CO.

Built 20 Years Ago
and
Still Going Strong

AJAX-HOGUE Wire Drawers



One of the first Ajax-Hogue Wire Drawers Built. Still in operation at the Chandler Products Corp. Cleveland, Ohio

Courtesy of Tru-Fit Screw Products Corp. Cleveland, Ohio

Courtesy of Chandler Products Corp. Cleveland, Ohio

These Ajax - Hogue Wire Drawers Have Been Drawing Accurate and Straight Wire from Coiled Rods for Cold Headers Since 1934

— write for Bulletin No. 111-A —

THE Ajax MANUFACTURING CO.

EUCLID BRANCH P. O.
CLEVELAND 17, OHIO

110 S. Dearborn St.
CHICAGO 3, ILL.

Dewart Building
NEW LONDON, CONN.

UNMATCHED
LUBRICANT CONTROL
conpor

gives less leakage, less friction, longer life, greater economy

Only Conpor gives you a complete range of porosity control

Conpor *is not* merely leather which has been surface-coated with an impervious elastomer. **Conpor** *is* a long-sought series of new and vastly superior materials for lubricant sealing, in which elastomer and leather are combined permanently to produce the exact degree of porosity and lubricity required. Lubrication of the sealing lip is controlled to give longer life and higher efficiency while objectionable leakage is minimized. **Conpor** *is not* completely impregnated.

Conpor sealing members are compatible with a wide variety of oils, hydraulic fluids, solvents, and gases. They remain flexible, heat stable, and fully operative for longer periods and at higher temperatures than any similar material. No other sealing material offers **Conpor's** outstanding advantages, long service life, and low cost.

Let Chicago Rawhide engineers show you how to solve your sealing problems at lower cost—with **Conpor.**

SEALS

Whether your application requires starved, semi-starved, or flooded sealing, Conpor provides the exactly right degree of lubricant retention.

STORES

Conpor sealing elements give full-depth lubricant storage—from sealing lip through the entire body.

LUBRICATES

Lubricant is available to the shaft contact area as required. There is no impervious film to endanger lubrication.

Get "*Report on* Conpor" for complete facts, tests, performance charts, modifications and range of applications. Write: A. S. Berens, Chicago Rawhide Mfg. Co., 900 N. State, Elgin, Illinois.

C/R
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CONTROLLED POROSITY
SIRVIS MECHANICAL LEATHER

CHICAGO RAWHIDE MANUFACTURING COMPANY

900 North State ELGIN DIVISION Elgin, Illinois

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Other **C/R** *products*

Oil Seals: Shaft and end face seals for all types of lubricant retention and dirt exclusion • Sirvene (Synthetic rubber) diaphragms, boots, gaskets, and similar parts for critical operating conditions • Sirvis: Mechanical leather packings and related products.

Free LITERATURE

(*Continued from page* 90)

Paint Stripping 21

Chemical paint stripping effectiveness on paint hooks or production parts is pictured and described in four-page bulletin. *Kolene Corp.*

Solenoid Valves 22

Valves for air conditioning and industrial applications are completely specified in 20-page catalog No. 199. Capacities to 50 tons of Freon-12 are available. *Detroit Controls Corp.*

Fabricating Nylon 23

How to fabricate parts of Zytel nylon is the subject of Product Engineering Bulletin No. 15. *Polychemicals Dept., Du Pont.*

Instrumentation 24

Custom engineering of electronic instrumentation—automatic data processing and control equipment—is the subject of a 16-page brochure recently announced to describe the company's newly-formed Systems, Div. Case histories, applications, facilities and methods of planning used to solve customer problems are features. Bulletin CEC-1304. *Consolidated Engineering Corp.*

Spray Deck Roof 25

Advantages of the dead level or spray deck roof in new plant construction are pointed out in a booklet offered by *H. F. Campbell Construction Co.*

Carbon Potential 26

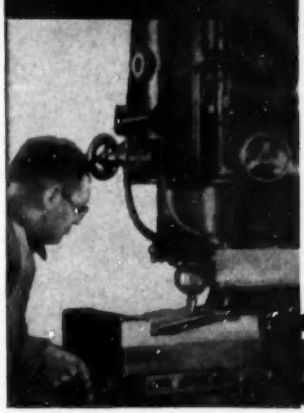
"Microcarb Atmosphere Control for Control of Carbon Potential in Homocarb Furnaces" is the subject of a new 12-page catalog just published by *Leeds & Northrup Co.*

T-J toughness

means more work between grinds...

LOWER DIE COSTS!

This T-J Cutter at work on a connecting-rod die block for a board drop hammer. Material being milled is "Hardtem" die steel. A cutter of right design and heat treatment for this high speed work in tough die steels, making possible maximum efficiency of these machines.



LARGEST SELLING CUTTERS FOR TOUGH DIE STEEL

Be sure of *top performance* in die sinking milling cutters . . . specify T-J! They're preferred everywhere today in die and forge shops . . . because T-J Cutters are *extra sturdy* . . . you can raise the feed!

Designed for speed, accuracy and long life . . . hold a sharp edge longer on job after job . . . less breakage! Made from an extremely high grade steel . . . properly machined . . . scientifically heat-treated and accurately ground. Wide range of styles and sizes to *reduce your* die costs. Send for new catalog 4-153. The Tomkins-Johnson Co., Jackson, Michigan.

38 Years Experience

FOR TOUGH JOBS SPECIFY T-J

TOMKINS-JOHNSON

RIVITORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHORS

an ACCO product

PAGE
Manufacturers' Wire

ROUND
FLAT
OR
SHAPED

LOW CARBON
HIGH CARBON
STAINLESS
SPECIAL ALLOY
ARMCO IRON

PAGE makes them all

YOU draw the Shape...
PAGE will draw the Wire

Cross-sectional areas up to .250" square; widths up to ⅜"; width-to-thickness ratio not to exceed 6 to 1.

Tell us the way you want it. We'll follow your specifications.

Write or wire today

ACCO
Page Steel and Wire Division
AMERICAN CHAIN & CABLE

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Bridgeport, Conn.

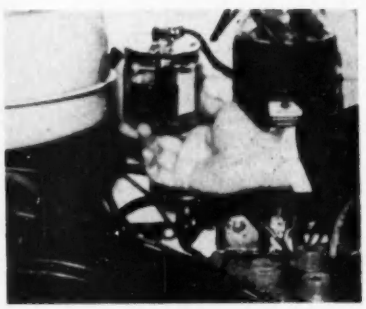
plus Welding Electrodes Wires Rods

NEW ACCESSORIES

Brake Fluid Check

A brake fluid indicator now is being offered for use on conventional cars and trucks by *Parts Div., Chrysler Corp., Detroit 31, Mich.*

The new MoPar safety brake fluid indicator is an assembly consisting



of a glass jar mounted on the engine side of the fire wall directly above the master brake cylinder with an attaching hose and valve mechanism that is installed in the filler plug of the master cylinder.

The jar is filled with approximately eight oz of brake fluid, bringing the level of fluid in the jar to two-thirds of capacity. As the braking system requires additional brake fluid, the fluid is syphoned into the master cylinder. Likewise expansion of the fluid causes it to flow into the glass jar instead of being lost through the breather vent. The device sells for a suggested retail price of $5.95.

Stops Rubber Squeak

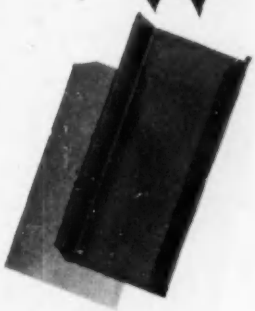
A penetrating lubricant for rubber and chassis bearings is being added to the *Du Pont Co.* No. "7" line of automotive products. Orel rubber lubricant is described as a fast-acting, non-petroleum lubricant, harmless to rubber. It is said to be an effective anti-squeak for all rubber-to-metal chassis parts as well as metal-to-metal contacts between chassis and frame.

Du Pont Orel is an exclusive synthetic lubricant formula, for which a

(*Turn to page* 188, *please*)

EASY . . . INEXPENSIVE TO POST-FORM THESE PARTS WITH

New DILECTO CF-1



- *Non-After-Glow characteristic*
- *A canvas-based laminate*
- *Post-Forms to shapes in inexpensive cold molds*
- *Excellent mechanical strength*
- *Resists abrasion, has long life*
- *Easily machined and punched*

Where can you use this new canvas-based C-D-F "Post-Forming" Dilecto grade CF-1? Presently it's used for a multitude of aircraft and semi-structural parts . . . as ribbed panels, fan blades and ammunition bay liners, guards and cover frames . . . as ventilating ducts, battery box containers . . . switch covers, thermostat mounting plates, etc. CF-1 has a tremendous potential in electrical as well as other industries because of its strength and light weight.

"Post-Forming" Dilecto CF-1 is easy to work with. Heated until pliable with infra-red, electric ovens, strip heaters or hot plates, or immersed in molten alloys or hot oil, it is then quickly placed in a cold mold and pressed or formed until cold enough to retain the desired shape. Inexpensive molds can be made from hard wood, cast or laminated plastics, steel and metal alloys. Normally C-D-F supplies Dilecto CF-1 in sheets from 1/32″ to 1/4″ thicknesses.

C-D-F's sales engineers (offices in principal cities) will cooperate with your designers and production experts. C-D-F also forms and fabricates Dilecto to your specifications. Write for technical bulletins describing Dilecto CF-1 as well as other grades of Post-Forming Dilecto.

NON-AFTER-GLOW — Post-Forming Dilecto CF-1 incorporates special chemicals in the varnish that produce no apparent after-glow once an ignited specimen has been extinguished. This product complies with the SAE-Aeronautical Material Specification AMS-3605, latest revision.

SILICONES, TOO — C-D-F offers other post-forming grades of laminated Dilecto: Grade GB-SF is a glass-base Silicone laminate furnished in a semi-cured state for forming pieces where high heat resistance and low dielectric losses are required. Can be formed into armature slot insulators, rectangular coil forms, primary-secondary cylindrical or rectangular insulators for dry type transfomers, etc. Grade XF Dilecto is a paper-base grade for mechanical applications where electrical properties are secondary.

THE NAME TO REMEMBER CDF FOR POST-FORMING DILECTO LAMINATED PLASTICS

Continental-Diamond Fibre

CONTINENTAL-DIAMOND FIBRE COMPANY

NEWARK 2, DELAWARE

GM and Ford Price Increases Move Toward Area Uniformity

The recent price increases by General Motors and Ford on some 1955 models represent an initial step toward uniform area pricing of automobiles. Whether or not this also constitutes a first move in the direction of eventual uniform pricing of new cars throughout the country is still very much speculative. General opinion appears to be that while there might possibly be some further adjustments toward equalization, complete abandonment of differentials in delivery charges will not come soon.

Cut Freight Rates Made Up

In their simplest terms, the new GM prices do not necessarily mean increased profits for the various divisions. Rather, they represent an equalizing movement to compensate for substantial reductions in freight rates to points 1200 miles or more from home plants located in Michigan. In other words, buyers in 80 per cent of GM's market will pay higher prices to offset reduced freight charges affecting the remaining 20%.

This does not mean that the buyer in the area outside the 1200-mile periphery will pay less, or even the same price, as buyers within the boundary of the 1200-mile circle. However, the difference will be substantially reduced, since delivery charges outside the designated circle are to be uniform, no matter whether the car is delivered only a short distance beyond the circle, or at the most extreme distance.

CUT COSTS . . . FASTEN "ON THE DOUBLE" with the Chicago "214" DOUBLE RIVET SETTER

The "214" automatically feeds, inserts and clinches two rivets at a time... with speed that may mean a big saving in your fastening costs.

14" throat makes large assemblies easy to handle. For up to 9/64" diameter steel tubular rivets—lengths to 7/8". Quick Change Rotary Type Hoppers and Raceways permit a 5-minute changeover to rivets of different size. Adjustable anvils and riveting centers add to its versatility.

Ask us how the "214" can help you cut costs. Send a sample of your problem assembly (or blueprint) for a Free fastening analysis.

FREE CATALOG

contains valuable engineering information and rivet specifications plus illustrated descriptions of 26 Chicago Automatic Rivet Setters.

Chicago Rivet & MACHINE CO.

9612 West Jackson Boulevard, Bellwood (Chicago Suburb) Illinois

Branch Factory: Tyrone, Pa.

CHEVROLET PRICES*

150 Series	1955	1954
Two-door sedan	$1,685	$1,623
Four-door sedan	1,728	1,680
Utility sedan	1,593	1,539
Two-door sta. wagon	2,030	2,020
210 Series		
Two-door sedan	1,775	1,717
Four-door sedan	1,819	1,771
Four-door sta. wagon	2,127	2,133
Delray coupe	1,835	1,782
Two-door sta. wagon	2,079	1,782
Bel Air Series		
Two-door sedan	1,888	1,830
Four-door sedan	1,932	1,884
Four-door sta. wagon	2,262	2,283
Convertible	2,206	2,185
Sport coupe	2,067	2,061

*Advertised delivered prices at Flint, Mich., which include dealer handling, factory handling and Federal taxes.

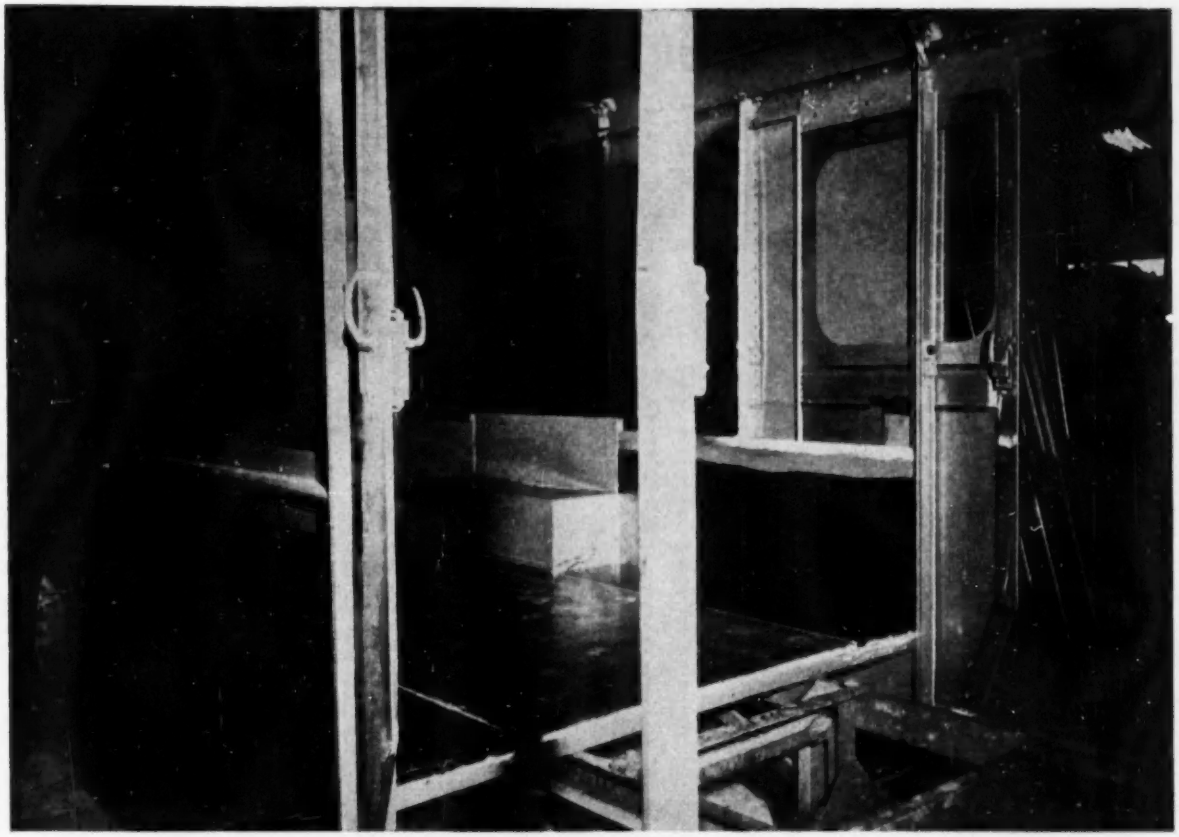
Chevrolet, Pontiac Actions

Chevrolet was the first General Motors division to announce new prices ranging up to $62 above comparable 1954 prices on six-cyl models. In addition, buyers wishing new V-8 engines pay $99 extra. It should be noted, however, that Chevrolet also announced decreases up to $21 in two station wagon models.

Only major change in price of accessories and optional equipment is a cut of $43.00 on the new linkage type power steering unit which Chevrolet is offering this year. The previous price, $134.50, is now $91.50.

Another very interesting price decrease is a reduction of $675 in the price of the Corvette sports car. This followed by a few days Ford's announcement of a list price of $2695 for its Thunderbird car.

(*Turn to page* 184, *please*)



Mayari R frame members are welded into a single unit before Mayari R side sheets are riveted in place. High endurance limit of Mayari R is valuable in bodies which are subject to repeated loading, unloading and vibrations.

Boyertown builds bodies 25 to 40 pct lighter with Mayari R

One of the pioneers of the walk-in body for retail trucks is the Boyertown Auto Body Company, Boyertown, Pa. Today Boyertown's line of delivery panels is the largest in the industry.

To make sure that Boyertown truck bodies are light in weight but strong, Boyertown makes good use of Mayari R low-alloy, high-strength steel. Because it has a yield point half again as high as structural carbon steel, they use Mayari R in lighter sections without sacrificing strength one bit. In this way they lower the body weight from 25 to 40 pct, depending on the type of body. In a typical case, a 2639-lb body was cut to 1885 lb, a reduction of nearly 30 pct.

This modern Boyertown body was built almost entirely with Mayari R low-alloy, high-strength steel.

Where frame members are welded together, Boyertown will tell you that they weld Mayari R as successfully as other materials, without special equipment or techniques. And they like Mayari R's superior ability to take battering, denting or abrasion. Mayari R will keep its paint job better, too—holds paint up to 80 pct longer, depending on the type of paint used.

In light trucks, heavy trucks, buses and tankers, Mayari R is proving its versatility. Our new Catalog 353 shows a wide assortment of motor-vehicle applications in which Mayari R is adding strength, holding down weight, or giving longer life in tough service. It's full of useful technical data too. For a copy, just get in touch with the Bethlehem office nearest you.

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BETHLEHEM, PA.

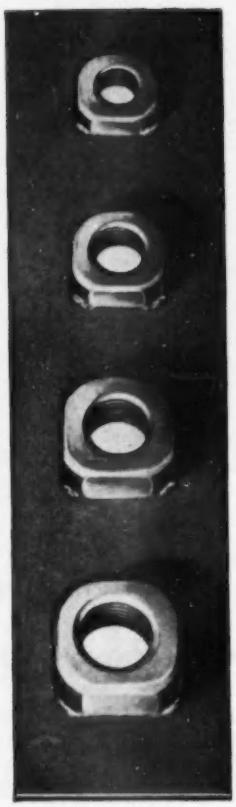
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Mayari R *makes it lighter... stronger... longer lasting*

For Speedy... Economical Assembly

SPECIFY MIDLAND Welding Nuts



Ideal for Hard-To-Get-At Places ...Will Not Work Loose or Rattle!

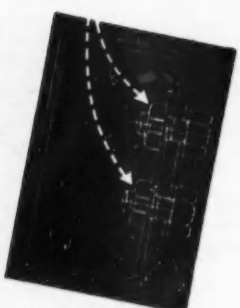
Whether you're designing a product or building it, the Midland Welding Nut is the answer to the problem of accurately and securely fastening metal parts into a main assembly . . . speedily, economically.

It is welded to the parts so that a bolt can be turned into it without the need for any device to hold it and keep it from turning.

This frequently means that one man can do the work of two, for with an ordinary bolt and nut one man usually has to hold the nut in place while a second man turns the bolt into it.

Midland Welding Nuts are perfect, too, for those hard-to-get-at places in assembly operations. Welded in advance to those inside spots where it is difficult —or *impossible*—for hands or tools to reach, Midland Welding Nuts hold fast while bolts are turned into them.

Write or phone for complete information *today!*



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AUTOMOBILE AND TRUCK FRAMES | AIR AND VACUUM POWER BRAKES | AIR AND ELECTRO-PNEUMATIC DOOR CONTROLS

New factory list price of the Corvette is $2575. Production of the car has dropped drastically since June, and at latest reports was running about 50 a month.

Pontiac also has announced price hikes on most of its line. Increases were a flat $59 on all models, except Catalinas in the Star Chief and 870 Series, which were cut $51. Station wagon prices were increased $24, while power steering units were cut to $100 from $125.

Ford Freight Decreases Less

Ford earlier announced a freight reduction program on 1954 cars and trucks delivered beyond a point 1000 miles from Dearborn, Mich. At the same time, it increased prices to dealers by $3 to $21.

Ford did not go nearly as far as General Motors on freight reductions. Consequently, it did not have to increase its prices as much. The result is that Ford dealers within the 1200-mile area set up by GM would have a price advantage on some models but would be at a competitive disadvantage on the West Coast.

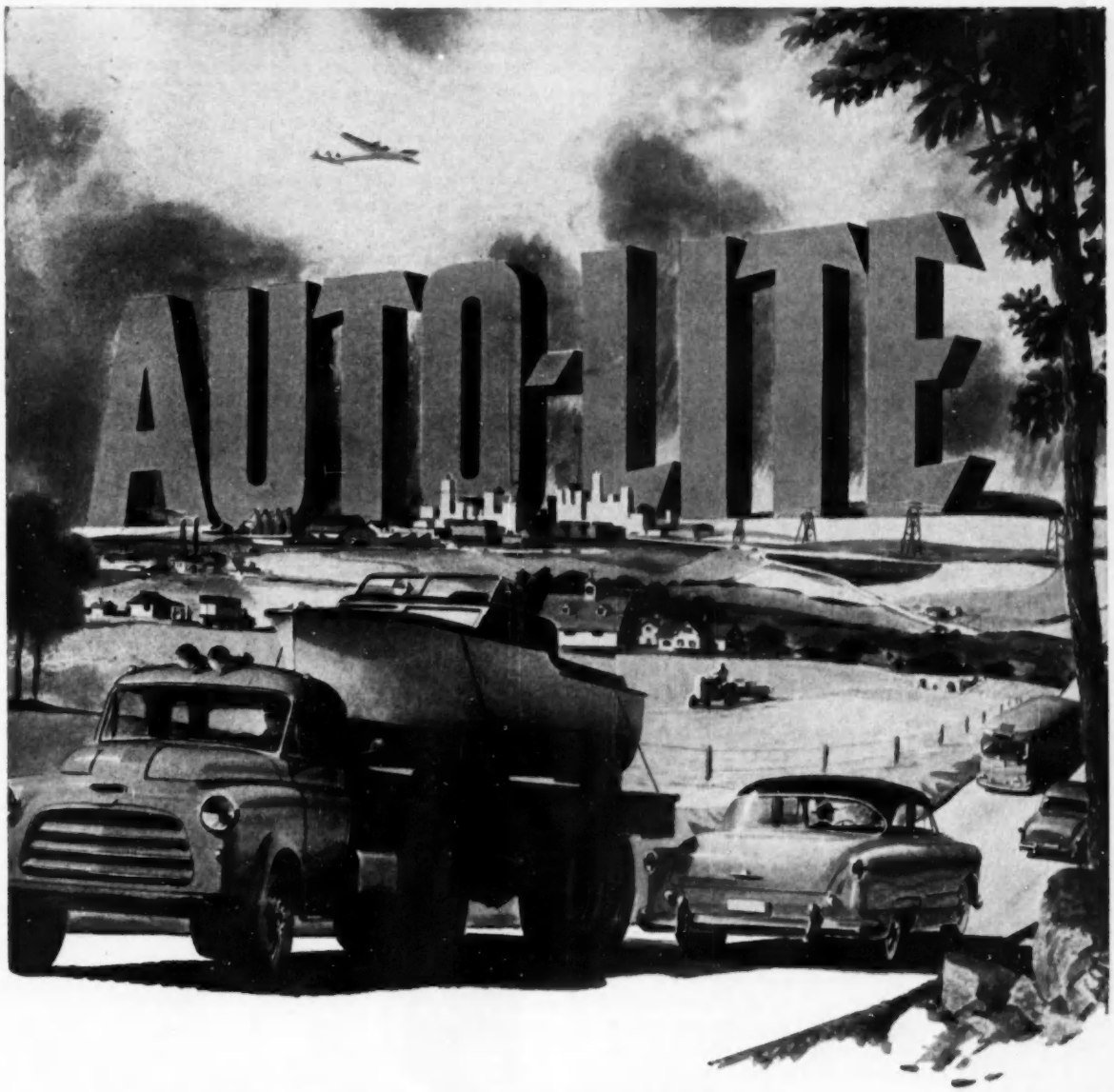
Another significant difference is that General Motors establishes a maximum freight charge beyond the 1200-mile limit which is uniform for all dealer points beyond the circle for each individual car line and model. Ford, on the other hand, cut the rate beyond 1000 miles to about 65 per cent of the previous freight charge but with variations directly proportional to the distance from Dearborn.

Timing of the Ford announcement two weeks after the company had closed out 1954 production at first indicated that it was setting the stage for 1955 prices. However, there was no indication at press time whether or not Ford would change its freight rate structure to distant points in

PONTIAC PRICES*

860 Series	1955	1954
Four-door sedan	$2,264	$2,105
Two-door sedan	2,105	2,046
Four-door sta. wagon	2,518	2,459
Two-door sta. wagon	2,434	2,375
870 Series		
Four-door sedan	2,268	2,209
Two-door sedan	2,209	2,150
Catalina	2,335	2,286
Four-door sta. wagon	2,603	2,544
Star Chief De Luxe		
Four-door sedan	2,362	2,303
Convertible	2,691	2,632
Star Chief Custom		
Four-door sedan	2,455	2,396
Catalina	2,499	2,558

*Advertised delivered prices at Pontiac, Mich., which include dealer handling, factory handling and Federal taxes.



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Around the world, more than 400 products of Auto-Lite are used day and night in cars, trucks, planes, boats and industry . . . convincing proof of the outstanding quality made possible by Auto-Lite advanced engineering and precision manufacturing. So to get the best in long life, in power and performance and in economy, it pays to insist on world famous Auto-Lite products.

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WINDSHIELD WIPERS • WINDOW LIFTS • SEAT MOVING MECHANISMS • HUB CAPS
WIRE & CABLE • SPARK PLUGS • METAL FABRICATED ASSEMBLIES • GRAY
IRON CASTINGS • ZINC & ALUMINUM BASE DIE CASTINGS

THE ELECTRIC AUTO-LITE COMPANY • TOLEDO 1, OHIO

the light of the General Motors uniform maximum delivery charge.

Behind-the-Scenes Motives

While there has been considerable opinion that the new pricing programs of GM and Ford were made to combat "bootlegging," another compelling reason could be the fact that the Government has been looking rather critically at the F.O.B. pricing system employed by both companies. Simply defined, first-class rail rates from home factories have been added to the price of the car at the delivery point, regardless of whether the car was built in a nearby assembly plant or delivered in some other manner at a rate lower than the rail charge.

Lawmakers have been active in the past few months in setting up investigations of the industry's pricing and other practices. It is conceivable that the new equalizing price structure was motivated by a desire to change the situation before definite Governmental action was taken.

Whether or not the two companies have gone far enough to satisfy the critics is an open question. There still is a definite price differential which increases with the distance from the factory up to the 1200-mile point for General Motors and 1000 miles for Ford.

Other Makers May Follow Suit

The issue of so-called phantom freight is not quite so important to Chrysler, which has assembly plants at Evansville, Ind., and San Leandro, Calif. The company announced, however, that it would alter its price structure to conform to the new pattern.

What companies such as Studebaker-Packard Corp. and American Motors Corp. will do to meet the new lower prices has not been disclosed. They probably will have to reduce either rail charges or base prices enough to get into line with new lower Ford, General Motors, and Chrysler delivered prices in distant areas.

A Change to Formed Tubes
Can Cut Your Costs
For many component parts, the strength and fabrication advantages of *formed tubes* can provide greater dependability and reduced weight as well as lower costs. And here at Formed Tubes, Inc. are the modern facilities, skilled workers and long experience needed to get all the advantages inherent in this construction. We make our own electric welded steel tubing. We fabricate steel, copper, brass and aluminum tubing to your specifications in ¼" O.D. to 6" O.D. and 20 ga. to 11 ga.
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1103 Prairie Street, Sturgis, Michigan

BOOKS...

CUPOLA OPERATIONS HANDBOOK, *published by American Foundrymen's Society, 616 South Michigan Ave., Chicago, Ill. Price, $9.50.* This second edition of a 332-page technical book represents the combined thinking of authorities on cupola operation by outstanding men of the foundry industry. The work should be a tremendous help to gray iron foundries, which are currently operating over 5000 cupolas in the U. S. and Canada. In tonnages, gray iron leads all other cast metals by a 12 to one ratio, so this addition to the modern foundry library is valuable. New material covers such late developments as hot blast, basic lining for nodular iron and emission control. Other chapters on refractories, principles of combustion, and metallurgy, if not presented for the first time, are greatly augmented by current additions.

PLASTICS ENGINEERING HANDBOOK, *published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. Price, $15.00.* Three years in preparation, the 20 chapters of this volume have been prepared by over 200 engineers, technicians, and other authorities in the various branches of the plastics industry who have worked on the 23 different Handbook committees of the Society of the Plastics Industry. The book contains over 500 illustrations, diagrams, charts, tables and three special fold-out inserts. The information in it covers design, materials, processes, equipment, finishing, assembling, testing and standards of plastics and plastics products.

COMPRESSED AIR HANDBOOK, *published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. Price, $8.00.* Prepared by the Compressed Air and Gas Institute, this is a comprehensive and practical guide detailing the information necessary to the most efficient and economical use of compressed air power in a wide variety of industrial applications. The handbook covers air and gas compressors of all types. It describes fully the use of compressed air and gas power in operating pneumatic tools, rock drills, and other air-operated devices. Furthermore, it covers the theory, selection, application, installation, testing, and maintenance of equipment.

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CATERPILLAR
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Where fast, sure starts mean dollars . . .
GLOBE BATTERIES ARE ON THE JOB!
Here's solid, down-to-earth proof that Globe batteries are extra tough and reliable . . . best for automotive equipment!
Batteries used on heavy industrial machinery *have* to "take it" . . . for "down time" means *big* money lost. Thus, the approval and use of Globe batteries in earth-moving and farm equipment is a real tribute to the durability and reliability of Globe batteries.
Naturally, Globe batteries for automotive equipment are equally dependable. They're built to stand up, through hardest use, regardless of weather or working conditions. They're packed with reserve power to keep engines "spinning" until they catch.
If you are not already using Globe batteries in your equipment, take a tip from the makers of other equipment that has to stand up: Specify famous Globe batteries . . . the batteries that are built better to serve better!
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We do utilize all the principal vibration control media because we believe each has its place, either alone or in combination in controlling vibration problems. We don't think one product, or even one type of product can solve all vibration problems efficiently and economically.
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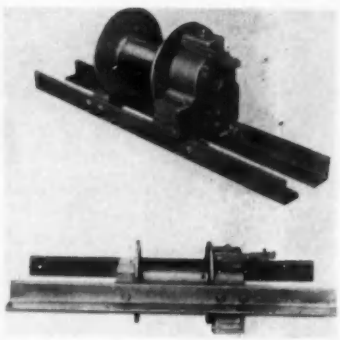
New Accessories

(*Continued from page* 180)

patent application has been filed. It contains no petroleum oil, castor oil, or graphite. The liquid is applied, as part of routine lubrication, with a brush or from an ordinary oil can that produces a small stream rather than a spray.

Winches

Two new 7000-lb truck winches have been announced by *Gar Wood Industries, Wayne, Mich.* Standard mount winch Model 7S is designed for installation behind truck cabs.



Low mount winch Model 7L mounts in front or at rear of truck chassis, or back of cab, and allows the entire truck platform to be used for the payload. The winches are of the worm gear, jaw-clutch drum type, designed for slow, heavy pulls with intermittent operation. They have cast aluminum gear case housings. A Gar Wood back draft clutch on the winches insures forced engagement between drum shaft and drum. The clutch is said not to back out if engagement is only partial, but to work itself into full engagement. The clutch is lubricated and fully enclosed in the gear case.

Roof Air Conditioner for Station Wagons

A.R.A. Mfg. Co., Fort Worth, Texas, has come out with an air conditioner that can be installed under the top of a station wagon. Since most air conditioners utilize trunk space, station wagons have had to do without them so far.

The new unit, it is claimed, does not interfere with vision or operation of the windows. Price of the roof air conditioner is $695 installed.

DRAFT FREE

reduce machining costs with

HUNTER DOUGLAS

IMPACT FORGING

FROM

HIGH STRENGTH ALUMINUM ALLOYS

These Impact Forgings are shown three-fourths actual size

These aluminum thick bottom cans were formerly machined from bar stock at great cost—now impact forged by Hunter Douglas to final print in one fast operation at low cost. The parts are illustrative of the endless variations in part geometry possible with Hunter Douglas cold impact forging. The "no-draft" characteristic effectively eliminates machining. Simply trim to length, drill holes in base for attaching bolts and the part is ready for final assembly.

To the economies achieved through impact forging can be added the superior physical properties resulting from this mass production technique perfected by Hunter Douglas. Increased fatigue properties are obtained and bending stresses at the inside corners are redistributed parallel to the flow lines rather than cross grain as would be the case if the part were machined from bar stock.

If you have a design problem that requires a similar part for mass production in quantities up to a million or more a month, remember the name, Hunter Douglas.

Our Research and Development Engineers welcome the opportunity to consult with you.

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Electronic Control for Car Assembly

With the rather recent development of electronic data processing systems utilizing computing and memory mechanisms, a great deal of thought has been given to the utilization of such equipment for inventory control, scheduling, and forecasting in the manufacture of automobiles. Very recently, one of the major producers in the electronic computer field—Remington Rand, maker of the Univac—has prepared an interesting report on the use of such equipment for assembly operations.

Inventory Control

The problem of controlling inventory, is of course, to correlate parts and assemblies on hand with the schedule requirements. As is generally known, there are a great number of model choices along with a much larger variety of accessories, upholstery, color and trim, which make the possible number of combinations of complete cars astronomical. The assembly of each car, however, is virtually a custom process.

Since there are some 20,000 stock items involved in the assembly operations, such an electronic system for inventory control and scheduling would comprise a magnetic drum with a 400,000 decimal digit capacity. This would be divided into 20,000 storage cells. Each one of these cells would be capable of providing storage for the stock item assigned, for the on-hand balance, the accumulated receipts, and the re-ordered level.

A number of keyboard stations would be provided from which the current balance could be immediately obtained, or through which new receipts may be entered.

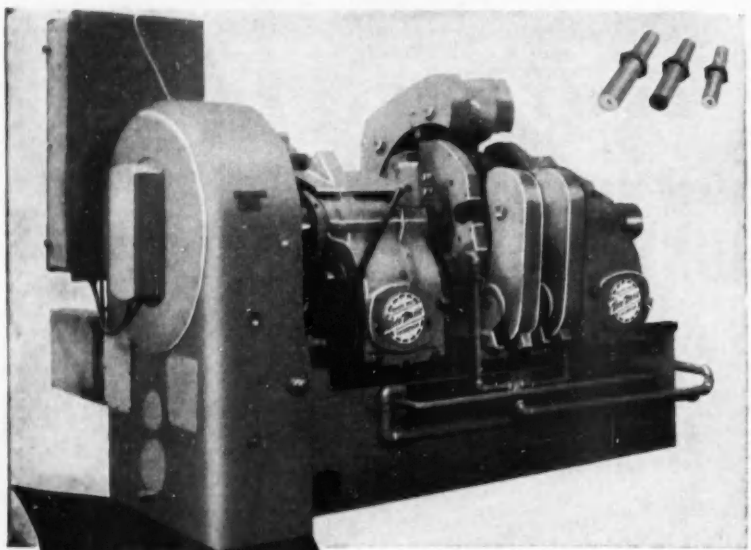
Usage will be accounted for by the introduction of pre-punched paper tapes, each of which contains the parts and assemblies required for a particular car. As each car is completed, the tape containing its parts and assemblies will be entered into the system to reduce the on-hand inventory of each such part or assembly.

Preparation of the punched paper tapes can be carried out prior to actual assembly of the car, one part of the tape containing all parts exclusive of accessories, upholstery, and trim; the other containing excluded items. Thus standard tapes can be used for the first group of parts and assemblies, whereas individually prepared tapes are required for the second group.

Provision would be made to reconcile on-hand balances against physical counts and accumulated receipts against total quantities shipped to the plant by the factories. A means can be incorporated for multiplying each entry on the punched paper tape by a constant, set up on the unit keyboard. Thus, the recording of usage of parts and assemblies for a number of similar cars can be effected from one reading of the appropriate tape. Finally, provision will be made for an automatic signal when any stock level is reduced below the re-order point.

Forecasting

If, however, a forecasting system is desired so that the material re-



Milling and Centering Simultaneously and in Continuous Production

Here's an excellent example of how two entirely different operations can be combined on one machine. This Davis and Thompson continuous type Roto-Matic both mills and centers on both ends in one operation. Rough and finish milling cuts on the ends of the shaft and centering of both ends is completed with only one rotation of the fixture drum. The centering heads travel with the work station until centering operation is complete then drop back to next work station and repeat. Automatic equalizing clamping is provided to the fixture. Spindles have micrometric adjustment and spindle carriers are adjustable on the ways to accommodate shafts of various lengths.

FREE DATA on this and other Davis and Thompson machines is available in our bulletin No. 1000.

Roto-Matic

Davis and Thompson Co.

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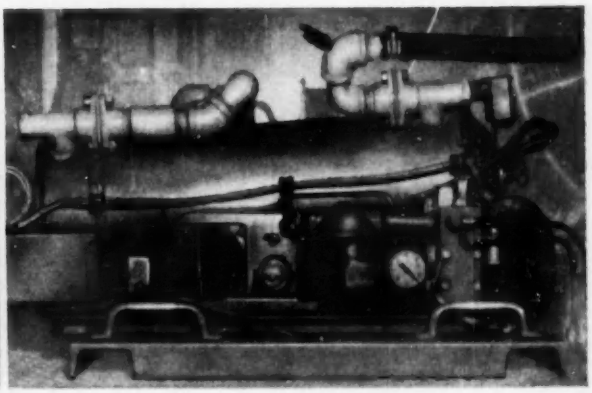


TYPE 0-6 CRASH TRUCK plus JANITROL LIQUID HEATER equals

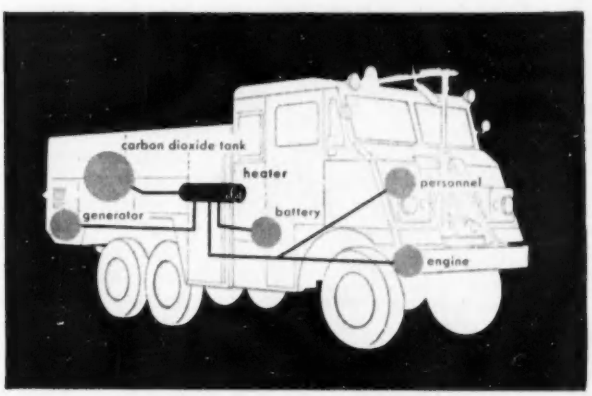
WINTERIZATION TO 65° BELOW ZERO

It takes just fifteen minutes for two men to install and connect, or disconnect and remove the Janitrol Liquid Heater equipped "winterization kit" in the Air Forces new Type 0-6 Cardox Crash Truck.

Cardox engineers took full advantage of Janitrol unit design accessibility . . . added a coolant pump, hand bypass pump, electrical over-ride connections, and an aluminum channel-iron skid base to come up with the ultimate in changeover speed. Just six quick-disconnect couplings tie coolant flow—electric supply—and fuel supply to the permanently installed winterization system within the truck. Operating controls are installed in the truck cab.

The Janitrol heater provides 90,000 Btu/hr for engine block, engine pan, battery box, radiator, cab and body, defrosting, a motor generator set, and the Cardox pressure vessel heating. Complete insurance against winter operating failures caused by freeze-ups!

Look into Janitrol Liquid Heaters' long record of dependability under all conditions—and you'll specify "Janitrol" for vehicle heat wherever and whenever needed.



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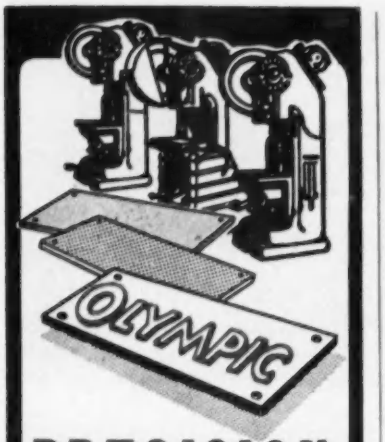

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Precision is an *established* habit at **OLYMPIC!** Close tolerances are met here with the ease and skill that come from 12 years' of leadership in meeting exacting electronics requirements. A record for *quality* gains notice . . . and so, key automotive designers, specifiers, and engineers now request great numbers of **OLYMPIC** *precision* stampings for every automotive need. And here are some good reasons why:

- **FACILITIES** . . . *complete* sample shop, engineering, design, and production departments at *your* disposal.
- **PRECISION METAL STAMPINGS** . . . *any* particular requirements met to *exact* specifications.
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METAL PRODUCTS COMPANY, INC.
ALPHA, NEW JERSEY

quirements will be known in advance, a more complete system than just inventory control will be required. Such a automotive manufacturer with a monthly forecast of material requirements and a daily reconciliation of scheduled production with actual production.

Material forecasting would be initiated on a master schedule of the desired production, for each of the next five months, of each model or finished part to be produced. This schedule would then be processed with a series of tape files (external memory) which explode the models into assembly, sub-assembly, parts and finally raw materials.

A second series of tape files would bring forward for each month of the forecast the inventory which remains after the month's requirements have been satisfied, until the inventory is exhausted.

The unsatisfied requirements then dictate purchase action for raw materials or for parts to be supplied from outside sources.

The operations in the electronic system would require 12 hr per month of time for the central computer, 300 man hr of typing on the magnetic tape and verifying, and one hour per month of high speed printing time.

From these operations and with this usage of time, the automotive company would produce and print a control material plan by normal count, a control material plan by pounds, a material purchase tape, and a new material balance forward. From these tapes in turn come four reports.

Thus, an automobile manufacturer's tapes would be created, sorted and developed in sequences which would be run through the electronic computer and "internal memory" of the system. Six operations must break down the many thousands of items in the manufacturer's models before the tapes for each report are developed and printed.

In the first operation 7000 items of raw data initiate the monthly cycle. They would be put on magnetic tape, verified and sorted to model-assembly sequences.

In the second operation, the sorted tape will be processed with a master model assembly tape of 100,000 items, exploding the model into its assemblies; and with a master assembly schedule tape of 3000 items to separate the assembly requirements of the forecast period. The results would be as follows: an adjusted master model assembly tape; an adjusted master assembly schedule tape; an active re-

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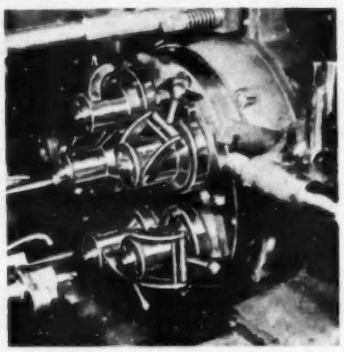

Singly or in combination, Zagar holding and indexing fixtures can expedite your work. Zagar shows you the *inexpensive* way, eliminating many special set-ups. Zagar provides the *effective* way, because work is held rigidly during machining. Zagar fixtures are not too costly. They are stocked for quick delivery.

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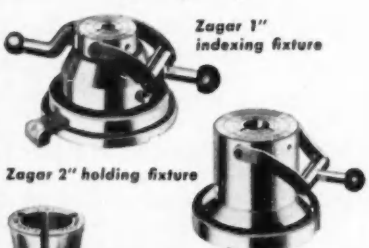

Zagar 1" indexing fixture

Zagar 2" holding fixture

Zagar 5-C pull type collet

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Machining work held by Zagar fixtures spells fast, accurate production for you. Accurate production spells profit and a worthwhile end product. Whether it's your own job or a customer's, production is materially assisted by Zagar fixtures and collets.

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quirements tape (100,000 items); an unmatched schedule items tape.

The new master assembly schedule would then be printed. The active assembly requirements would be sorted to an assembly number sequence and like-numbered items then summarized to 15,000 items.

During the course of the third operation, the electronic computer would prepare an assembly balance forward tape of 15,000 items. It would also determine the parts scheduled requirements of 75,000 parts and determine the raw material assembly requirements—12,000 items. Finally, it would maintain an assembly parts list tape of about 75,000 items.

The fourth operation would sort the 75,000 items, separating them from the unmatched schedule items and from the parts requirement tape. It would put the items into part number sequences and summarize like-numbered items. This would provide a total parts requirements tape of 15,000 items.

The fifth operation will produce a new parts balance forward report of 15,000 items, and the parts raw material tape of 15,000 items. Finally, the "exception" tape—which records items that have not been matched with appropriate file items for any reason—will be made up. The exception tape data is printed for human reconciliation.

Sorting and summarizing will be carried out during this sixth and final operation. The assembly raw material requirements of 1200 items as produced in operation 3, and the parts material requirements of 15,000 items produced in operation 5 will be handled.

This operation also would produce the total material requirements of 4500 items. The latter are processed with a like number of material balance forward items and controlled material plan balance forward items for the end reports required.

Automatic Scheduling

A second objective of this application of an electronic computer supplies each departmental foreman with a daily schedule. The daily schedule shows for each model, assembly or part the on-hand accumulated production, accumulated usage, and requirements needed to meet the schedule for the next three months or more.

With less than five hours per day of utilization of such a computer system, up-to-the-day production schedules for 75,000 parts, assemblies and end items would be produced.

In this system new schedule requirements, changes of all items and move orders from the inspection stations would be handled daily. New schedule requirements reflect the increase or decrease in the requirements schedule determined over the last 24 hours.

On a daily basis, the requirements are spread over the next seven calendar days; on a weekly basis for the following three weeks; on a monthly basis for the coming two months.

Thus, even major changes in requirements can be absorbed with a minimum of disruption to manufacturing operations.

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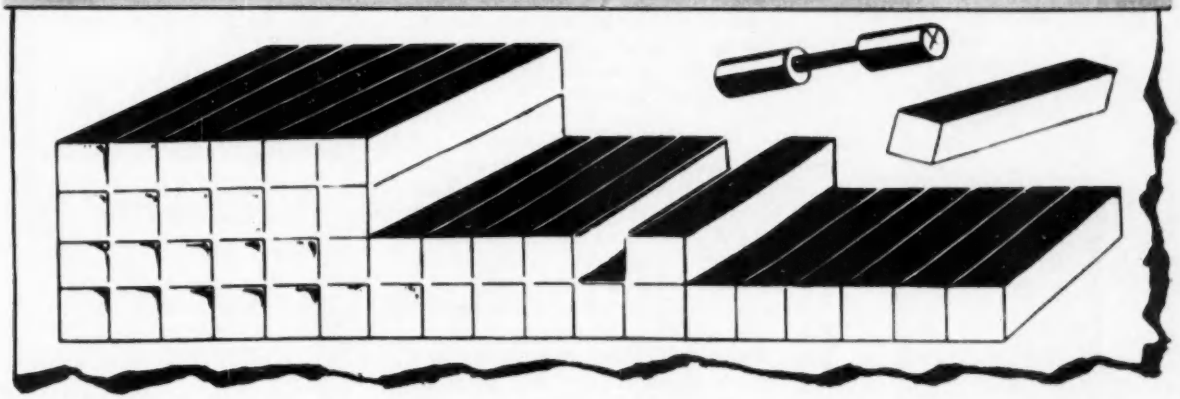
MANUFACTURING

If You Want the QUALITY of the TEST BAR in Your Castings— *Use* FRONTIER 40-E ALUMINUM ALLOY!



ORDINARILY the physical properties of an aluminum-alloy casting are less than those of a separately-cast test bar. But because of the special qualities of FRONTIER 40-E — the *non-heat-treated* aluminum alloy — you can be sure that *the same high qualities which show up in the test bar will appear uniformly throughout a large casting.* The following tables tell the story:

40-E Step Block Casting Cut Into 42 Test Bars—Physical Properties of each Shown in Squares.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Y.S.	22.5	20.0	21.2	20.6	20.5	22.0	20.8	21.0	21.8	22.5	23.0	23.4	23.0	25.0	23.8	22.5	23.5	24.6
T.S.	38.3	33.0	33.1	32.7	33.8	36.0	33.8	32.5	33.5	34.5	34.0	37.2	37.8	39.0	36.8	36.5	36.7	40.0
El.	12.5	10.0	6.0	4.0	7.5	7.5	8.0	7.0	7.0	7.5	7.0	8.0	8.5	8.5	7.5	8.0	7.5	10.0

	30	29	28	27	26	25	24	23	22	21	20	19
Y.S.	22.0	23.0	22.5	21.5	22.5	23.5	22.5	23.5	23.5	23.8	22.8	23.8
T.S.	36.3	35.3	35.3	35.0	35.0	37.3	34.5	32.0	32.5	32.5	35.0	38.3
El.	10.0	6.0	9.0	7.5	7.5	6.0	5.0	5.0	5.0	5.0	7.5	7.5

	31	32	33	34	35	36
Y.S.	23.0	22.8	22.5	24.0	23.5	23.0
T.S.	36.3	33.3	32.5	32.5	36.3	39.0
El.	8.0	5.0	5.0	5.0	7.0	8.5

	42	41	40	39	38	37
Y.S.	23.3	23.7	23.0	23.2	23.0	22.5
T.S.	33.2	37.1	36.4	37.3	38.0	40.8
El.	3.0	8.0	6.5	6.5	11.0	11.0

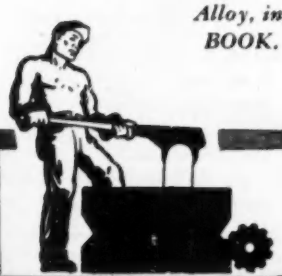
SEPARATELY-CAST TEST BAR PROPERTIES		
Nat. Aged 21 days	Y.S.	23500
	T.S.	36600
	El.	7.5

Properties of Casting (based on tensile strength readings)

	Maximum	Minimum	Average
Y.S.	25,000	22,500	22,700
T.S.	40,800	32,500	35,500
El.	11.0	5.0	7.5

Write TODAY for full details about Frontier 40-E Aluminum Alloy, including FREE DATA BOOK.

S.A.E.	310
A.S.T.M.	B-26-50T Alloy ZG-61A (Castings)
A.S.T.M.	B-179-51T Alloy ZG-61A (Ingots)
Federal	QQ-B-601a Comp. 17
Navy	QQ-B-601a Comp. 17 46A-1-Class 1
Air Corps	QQ-B-601a Comp. 17



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Metal Show Developments

(*Continued from page* 102)

aluminum honeycomb cores to aluminum sheets. Polyester resins for glass-fiber reinforced plastic automobile bodies and for reinforced appliance housings, as well as phenolic resins for bonding sand into shell molds, were among the other plastics at the Bakelite booth.

Air Reduction introduced the use of carbon dioxide as a shielding gas for the Aircomatic welding of mild steel. Proved as effective in certain mild steel applications, the use of CO_2 in Aircomatic welding is said to provide further cost savings. The Aircomatic-CO_2 demonstration in the Airco booth was performed on carbon steel crossover pipe and flange assemblies such as those used in the automobile industry. The joint as made on two inches diameter, 0.075 in. thick piping and ¼ in. thick flanges at a welding speed of eight seconds or at a rate of about 60 ipm. Airco's A675 carbon steel Aircomatic wire, 0.045 in. in diameter, was used at a current of 200 amp, dc reverse polarity. An arc voltage of 24 volts and a CO_2 gas flow of 40 cfh were employed.

Consolidated Vacuum Corp. showed a new five to 50-lb packaged high vacuum induction melting and casting furnace. This laboratory furnace was designed to meet the need of metals producers to investigate the effect of high vacuum processing on old and new alloys, particularly the high temperature alloys now in great demand by aircraft engine manufacturers. Visitors saw demonstrated the short pump-down time made possible by a large capacity diffusion-ejector pumping system which is also capable of maintaining the low pressures from 0.1 micron to 10 microns required during melting and casting to assure a gas free pour.

To take visitors to its exhibit inside a four-foot diameter vacuum furnace and let them watch the actual melting and casting of high-purity metal, F. J. Stokes Machine Co. used closed-circuit television. The camera, trained on the interior of the chamber, picked up details of the operation and transmitted them over a short length of coaxial cable to a monitor screen which was so placed in the booth that it could be seen by many visitors at once. The furnace was a brand new unit Stokes introduced at the Metal Show. It is of 50-lb capac-

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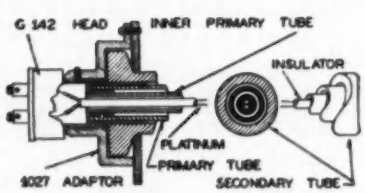
A background of many years of experience and "know-how" go into the production of Gordon Platinum, Platinum-Rhodium Thermocouples. From this experience has evolved the Gordon policy which calls for the utmost in quality and service, the utmost in value to clients. That is why Gordon platinum wire is carefully checked for thermocouple accuracy against a master thermocouple...calibrated and certified by the National Bureau of Standards.

The porcelain insulation and protecting tubes which go into a complete thermocouple assembly are of the finest quality obtainable. They are the best known means of preventing contamination of the elements which result in false e.m.f. values. Also, the Gordon G-142 head which goes into a complete thermocouple assembly is light in weight and permits easy replacement of new elements into a protecting tube assembly.



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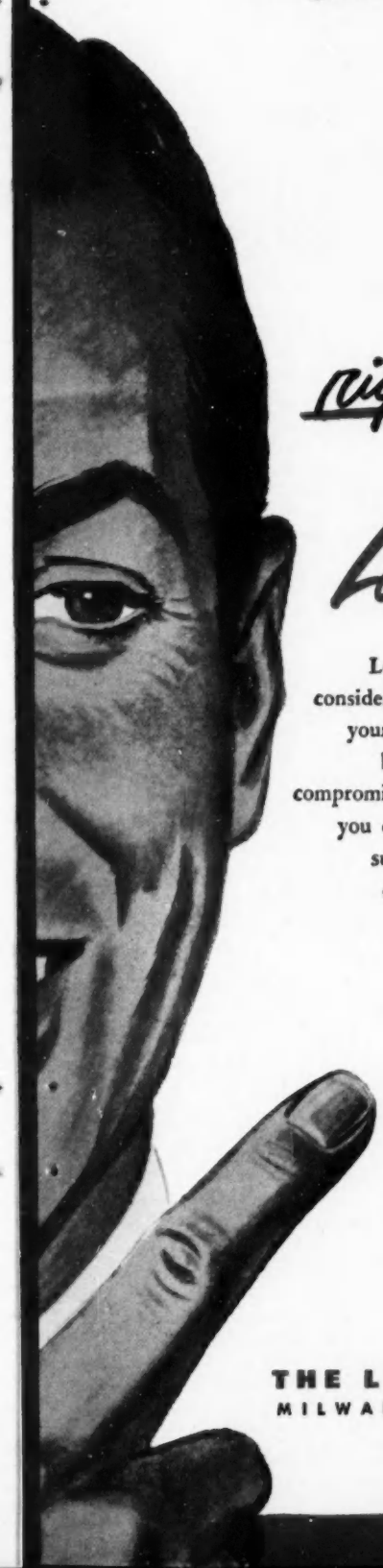

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It pays to think first of the Louis Allis Co. whenever you're considering adjustable speed drives for your product or plant. Louis Allis builds all basic types. There's no compromising — from this complete line you can select the unit that's exactly suited to your job conditions and engineered for your application.

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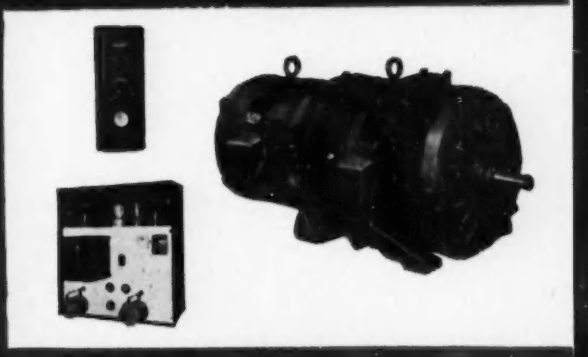
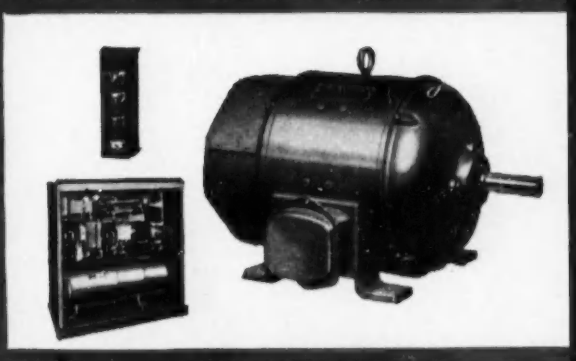
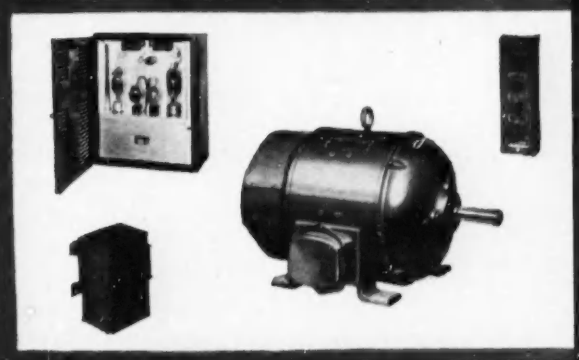






ity, suited for moderate-scale production or for experimental and pilot-plant work.

A standardized clutch - brake - flywheel combination, made by the Fawick Airflex Div. of Fawick Corp., was demonstrated on an open back inclinable press. This package unit is designed as a replacement for existing press clutches and brakes.

A variety of powdered metal parts currently being processed for the automotive industries were shown by the Yale & Towne Manufacturing Co., Powdered Metal Products Div. These included a high-copper content brake adjuster mechanism which wears with brake lining, oil pump gears, shock absorber rod guides, manifold heater, inlet valve protector, and others.

An automatic speed control for U. S. Varidrive motors, which is sensitive to such variables as pressure, temperature, speed or liquid level, was demonstrated by U. S. Electrical Motors Inc. Named Varitrol, it may be operated either manually or automatically on 60 to 100 psi air pressure. It is controlled by a cylinder using air on both sides of the piston. It features approximately straight line relationship between signal pressure and speed and is said to be of uniform sensitivity over the entire speed range.

The new fractional - horsepower Vari-Speed Motodrive was the feature exhibit of Reeves Pulley Co. The device features a so-called "all-position" 14-turn hand wheel control with a full vision indicator. Electric remote control, mechanical automatic control, and Auto-Pneumatic control accessories are offered for this unit. Other accessories include tachometers and magnetic brakes.

Oakite materials introduced during the past year and never before exhibited included a liquid inhibitor for pickling solutions, an alkaline rust remover, an aluminum etch spray wash, and an electrical cleaner for copper and its alloys.

Applications of nickel alloy steels, nickel steel castings, Ni-Resist and Ni-Hard were featured at the International Nickel Co. booth. Various applications of Inconel, Inconel "X" and Nimonic "75" for high temperature applications included a combustion chamber and flame tube for jet engines. Another portion of this exhibit showed the use of Inconel and Incoloy for furnace applications, including radiant tubes, quenching fixtures, and carburizing equipment.

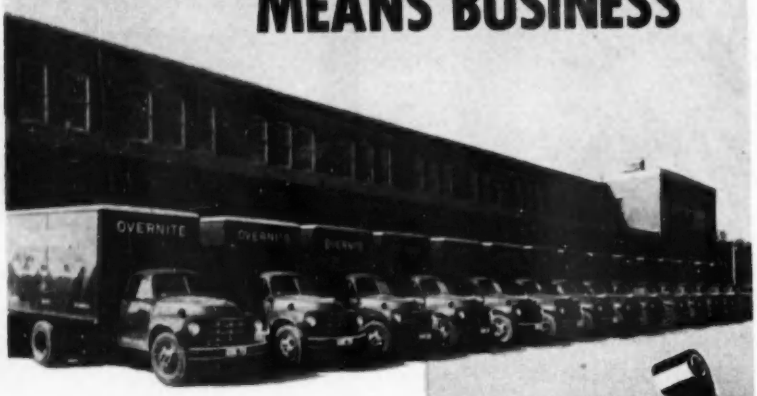
First demonstration of the "400 Series Controller" was made by the Wheelco Instrument Div. of Barber-Colman Co. This controller comes in at least seven control forms and features ease of scale reading through the elimination of outside light reflection and wide angle of vision.

A power tool for inserting wire screw thread was demonstrated at the booth of the Heli-Coil Corp. The tools are powered by air or electricity and are designed to be held in the hand or in line presses.

The Agietron process for processing hard metals by spark erosion was demonstrated by Electro Arc Sales Co. A high-frequency spark discharge is obtained from regular a-c power lines, using only resistors and condensers. Typical of the materials being cut were various all-sintered metals, tungsten carbide, Stellite and high speed steels.

A giant motion display of its new catalog of machinery for metal parts processing was the theme of the Metalwash Machinery Corp. exhibit. Some 122 types of washing, pickling, drying, degreasing, and tempering machines were described or demonstrated. Features were a full size flat built wash and dry machine and a scale model conveyorized degreaser, both operating.

Burton SPRINGS
MEANS BUSINESS



Your business depends upon your ability to deliver the goods. By equipping your motor transport vehicles with Burton Leaf Springs, you assure your load the maximum amount of security on the road.

Burton Springs are manufactured to the most rigid standards to give unexcelled performance under all conditions. When your equipment is hauling heavy goods under contract, you'll know that load is safe riding on Burton Springs.

Our engineering experience and skill have found wide acceptance throughout the motor transport industry. Studebaker, as well as many other notable manufacturers, use Burton Springs as original equipment.

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For nearly half a century, leading tractor, truck and trailer manufacturers have learned to depend on The Cleveland Welding Company for high-quality, lightweight rims designed for strength and safety.

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Because of our economical production methods and favorable location, we are able to afford you significant advantages as your primary source for production-quality rims. May we talk it over? Write THE CLEVELAND WELDING COMPANY, W. 117th St. & Berea Rd., Cleveland 7, Ohio. (Subsidiary of American Machine & Foundry Company, New York.)

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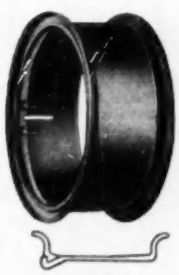
CLEVE-WELD

PROTECTO-TIRE RIMS

3-Piece Truck Rim



2-Piece Truck Rim

Deep-Well, Drop-Center Tractor Rims

Wide-Base, Attached-Clamp Tractor Rims

a CMP cost cutting report

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made it easier at less cost

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This manufacturer of spring steel parts purchased annealed spring steel and processed it for desired temper preceding fabrication. Frequently problems of non-uniformity slowed down production. Often-times parts did not meet specifications--tolerances were too variable--fatigue tests would not meet requirements. It all added up to many costly rejects.

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These problems were given to a CMP representative for study and, after several discussions with CMP technical representatives, a new manufacturing procedure was established. Specific specifications were developed by CMP for each spring steel application and, after approval by the Customer, CMP then produced and processed tempered spring steel to each such specific specification. The manufacturer's previous problems of fabrication and tempering-in-process were eliminated and the manufacturer showed an improved cost on each such spring steel job, proving once again that it is worthwhile to utilize the CMP technical spring steel experience which is available to you at any time.

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Industry News

(*Continued from page* 104)

Ford Offers Night Tours Of Steel-Making Plant

For the first time in 37 years, Ford Motor Co. is offering night tours of its steel-making operations at the 1200-acre Rouge plant. Believed to be the only evening trips in the car industry held for tourists, the hour-long tours will start at 7:30 p.m. Monday through Friday.

Visitors will view the open hearth furnaces, rolling and blooming mills, and stamping plant in operation. The tours will be suspended temporarily on Nov. 26 for the Christmas Fantasy show in the Rotunda but will resume again in January.

IHC Adds Delivery Trucks With Greater Capacities

Three new greater-capacity delivery truck models with Metro (R) bodies and gross vehicle weight ratings from 14,000 to 16,000 lb., have been introduced by the Motor Truck Div. of International Harvester Co.

The new models, with a body capacity of 396 cu ft, are the RM-160, with 14,000 lb GVW rating; the RM-161, 15,000 lb GVW rating; and the RM-162, 16,000 lb GVW rating. Wheelbase is 137¾ in.

U. S. Tax on Automobiles Could Buy All 1952 Cars

The big chunk the Government gets in excise taxes out of the automobile sales dollar was pointed up recently by the National Automobile Dealers Association. An NADA report shows that the Federal excise taxes collected on the sale of automobiles, trucks and accessories from 1917 to 1952 would buy almost all the cars produced in 1952.

More than $6 billion was collected in that period. This amount, if laid end-to-end, would stretch 600,000 miles, equivalent to 24 trips around the world. In 1952 alone, the NADA report states, the Government took in enough in excise taxes to buy 401,412 automobiles at $2400 a unit.

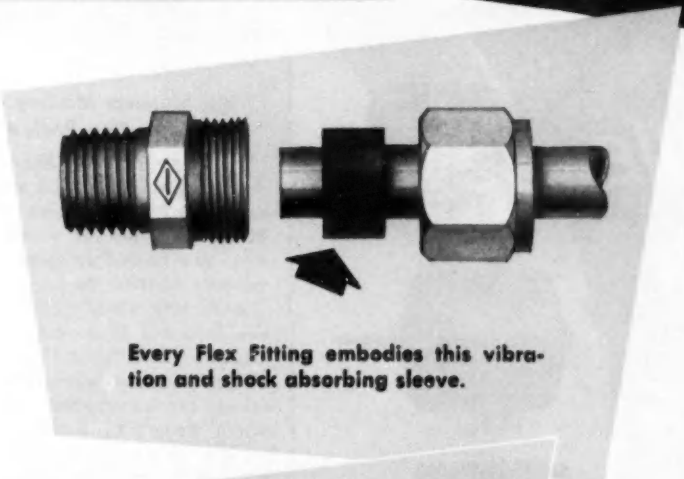
Such taxes paid in 1952 by New York, California, Pennsylvania, Ohio, Texas, Michigan and Illinois, when combined, would total more than the entire income of the state of Nevada, NADA said.

(*Turn to page* 202, *please*)

The Fitting that Never Gets Tired of Absorbing Shocks and Vibration!

IMPERIAL FLEX FITTINGS

... Make Tube Fitting Failures Unnecessary



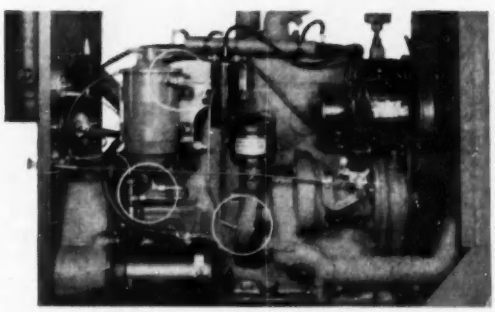
Every Flex Fitting embodies this vibration and shock absorbing sleeve.

FLEX FITTINGS make safer joints that are virtually indestructible by vibration . . . absorb shock and minor tube movement . . . assure a positive pressure-tight seal.

FLEX FITTINGS are very easy to install . . . simply slip nut and Flex sleeve over tubing . . . insert tubing into body and tighten nut — that's all!

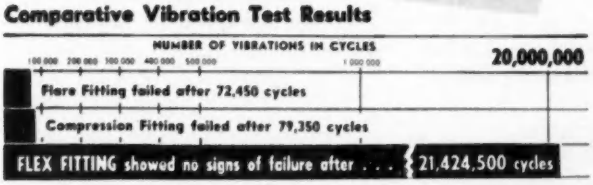
The Flex Fitting actually permits the tube to flex back and forth through angle shown. Note that tubing is cushioned against any damage.

FLEX FITTINGS can be used with all kinds of tubing



If you have a tough tubing connection job that involves vibration, shock or tube movement, it will pay you to consider IMPERIAL FLEX FITTINGS. Whether it's tractors, diesels, heavy power equipment, machinery or earth movers, you will be safe with FLEX FITTINGS. Thoroughly proved by extensive use.

Comparative Vibration Test Results


NUMBER OF VIBRATIONS IN CYCLES
100,000 200,000 300,000 400,000 500,000 1,000,000
20,000,000
Flare Fitting failed after 72,450 cycles
Compression Fitting failed after 79,350 cycles
FLEX FITTING showed no signs of failure after . . . .
21,424,500 cycles

On vibration tests, where other fittings failed quickly, Flex Fittings withstood over 20,000,000 cycles without sign of failure.

Ask for Catalog 344

THE IMPERIAL BRASS MANUFACTURING COMPANY

1241 W. Harrison St., Chicago 7, Ill.

In Canada: 334 Lauder Ave., Toronto, Ontario

IMPERIAL

Pioneers in Tube Fittings and Tube Working Tools

Industry News

(*Continued from page* 200)

GM Develops Powerplant For Government Vessel

The Maritime Administration, which is planning experiments with a variety of new propulsion plants to improve efficiency of merchant vessels, is to get a free-piston gas generator-turbine from General Motors Corp., it is reported.

Cleveland Diesel Engine Div. of GM intends to develop this novel type of power plant in time to permit its installation aboard a Liberty ship in the fall of 1955.

The ship to be converted is one of four scheduled for modernization in an $11 million Maritime Administration program. Propulsion units that will be tested include: a gas turbine, to be built by General Electric Co.; a steam turbine, the contract for which will be placed soon; and the new free-piston plant.

Leece-Neville
. . . a reliable source for SMALL MOTORS in LARGE VOLUME
for
• HEATERS • WINDSHIELD WIPERS
• DEFROSTERS • SEAT ADJUSTERS
• AIR CONDITIONERS • CAR COOLERS
• PUMPS • WINDOW REGULATORS
• MARINE VENTILATORS

Leece-Neville Small Motors are produced for automotive use in 6 volt to 32 volt systems. Higher voltage motors are available for other applications. For full information, write The Leece-Neville Company, Fractional H. P. Motors Division, Cleveland 13, Ohio.

Chevrolet Forge and Foundry Are Expanding Appreciably

Chevrolet's new $30 million forge and foundry in Tonawanda, N. Y., are expected to create an additional 1600 jobs at peak production in 1955. The division added approximately 1100 new jobs in the forge and foundry this year to offset partially an aviation engine contract completion.

The two new units together are said to form the largest forge and foundry operation in the area in terms of tonnage. They will use local raw materials and will furnish gray iron castings for the Tonawanda Motor and Buffalo Delavan Ave. plants.

Air Museum Making Quest Of Aviation Periodicals

The National Air Museum is endeavoring to complete a ready reference library of aviation periodicals. Scattered issues of aviation magazines are needed to complete partial volumes already on hand.

AUTOMOTIVE INDUSTRIES' subscribers are requested to donate or exchange magazines. A "want list" and a list of duplicate issues available for exchange can be supplied upon request. Write Robert C. Strobell, associate curator, National Air Museum, Washington 25, D. C.

High Engineering Award Given to Alfred Sloan

The Hoover Medal, outstanding engineering award, has been presented to Alfred P. Sloan, Jr., board chairman of General Motors Corp. Named in honor of former President Herbert Hoover, the medal, given for distinguished public service, was presented to Mr. Sloan at the annual dinner of the American Institute of Consulting Engineers recently.

Atomic Equipment for Tire Production Used in Mexico

Goodrich-Euzkadi, producer of tires, is the first Mexican firm to install atomic control equipment in Mexico. It will be used to regulate and measure the thickness and weight of rubberized cords at the company's Lago Alberto plant.

The plant produces 1600 car and truck tires daily and has a top capacity of 3000. The atomic control unit importation required a special U. S. Atomic Energy Commission permit as well as Mexican approval.

(*Turn to page* 204, *please*)

Another U. S. Engineered Rubber Product serving the automotive industry

It's here!

Designers can now specify noiseless, positive power transmission with the U. S. Rubber

PowerGrip TIMING Belt

This revolutionary belt gives the automotive designer new opportunities! U. S. PowerGrip gives *positive* power transmission. It operates on fixed centers. **No lubrication is needed.** But if lubrication is encountered from other machine parts, we provide belts that are oil-resistant—even to hot oil. Just a few of its exciting possibilities are:

1 – Extreme low stretch, great flexibility in the range of center distances make the belt ideal for camshaft drives. *No noise—no lubrication.*

2 – PowerGrip's higher load capacities, its length range (from a few inches to many feet) and its width range (⅛" to 15") makes it ideal for use on window regulators and governors, accessories and special equipment.

High efficiency, small pulley diameters, fixed centers and a single belt instead of a multiple drive make PowerGrip a natural for dozens of automotive applications. United States Rubber Company engineers will gladly work with any automotive manufacturer who is interested in the great advantages of U. S. PowerGrip. Just phone us at Trinity 4-3500, Detroit, and ask for Mechanical Goods Division, or write address below.

US RUBBER

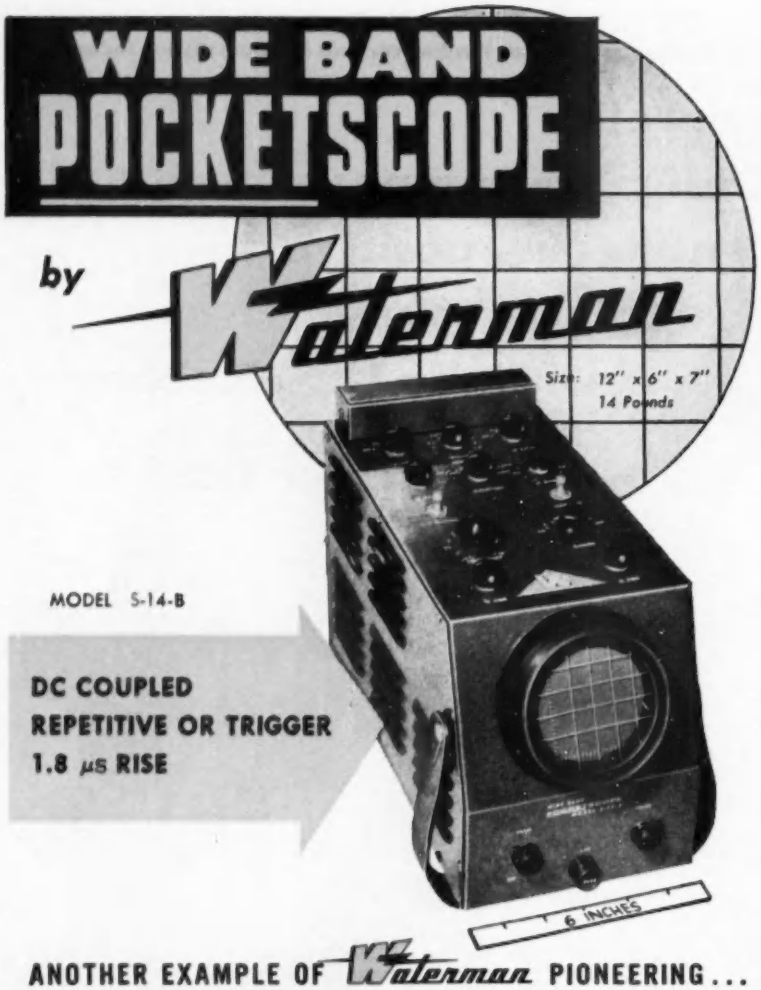
"U.S." Research perfects it... "U.S." Production builds it... U.S. Industry depends on it

UNITED STATES RUBBER COMPANY

Automotive Sales, Mechanical Goods Division, New Center Bldg., Detroit 2, Michigan

WIDE BAND POCKETSCOPE

by Waterman



MODEL S-14-B

DC COUPLED
REPETITIVE OR TRIGGER
1.8 μs RISE

ANOTHER EXAMPLE OF Waterman PIONEERING...

The WIDE BAND POCKETSCOPE, model S-14-B, hits a new high in frequency response for light, compact, truly portable oscilloscopes. The response extends all the way from DC to 700 KC within —2 db without peaking. Thus providing a pulse rise time of 1.8 microseconds. Furthermore, sensitivity has not been unduly compromised in order to accomplish such fidelity. The vertical sensitivity is 50 millivolts rms/inch. The sweep is operated in either a repetitive or trigger mode and covers a range from 0.5 cycles to 50 KC with synchronization polarity optional. Other essential vertical and horizontal amplifier characteristics include non-frequency discriminating attenuators and gain controls as well as individual calibration voltages. Additional provisions for direct access to all the deflection plates, the second anode, and the amplifier outputs help to make the S-14-B a standout instrument of flexibility and utility. All this plus portability! The incredibly small size and light weight of the S-14-B now permits "on-the-spot" use of the oscilloscope in all industrial, medical, and electronic fields. Its rugged construction assures "laboratory performance" regardless of environment.

WATERMAN PRODUCTS CO., INC.

PHILADELPHIA 25, PA.
CABLE ADDRESS: POKETSCOPE

MEMO... Write for details today!

WATERMAN PRODUCTS

WATERMAN PRODUCTS INCLUDE

S-4-C SAR PULSESCOPE®
S-5-A LAB PULSESCOPE
S-6-A BROADBAND PULSESCOPE
S-11-A INDUSTRIAL POCKETSCOPE®
S-12-B JANized RAKSCOPE®
S-14-A HIGH GAIN POCKETSCOPE
S-14-B WIDE BAND POCKETSCOPE
S-15-A TWIN TUBE POCKETSCOPE
RAYONIC® Cathode Ray Tubes
and Other Associated Equipment

Industry News

(*Continued from page* 202)

Vehicle Sales in Nine Months Drop 800,000 Under 1953

Total motor vehicle sales of 4,959,297 for the first nine months of this year are still about 800,000 units lower than in the corresponding period of 1953. Included in the 1954 nine-month period are 4,169,518 cars, 768,864 trucks, and 2915 buses. The changeover period for new cars this year dropped total factory sales to 369,942 in September, a sharp decline from the 574,631 in the same month last year.

Exports continued to account for about six per cent of total factory sales, and amounted to 298,958 units during the first nine months. In the same period last year, exports represented about four per cent of total vehicle sales.

Allis-Chalmers To Build Atom Power Plant for AEC

Allis-Chalmers Mfg. Co. next year will start construction on a $17 million experimental power plant for peacetime use of atom power. It will be the third such plant to be built under the Atomic Energy Commission's $200 million program. Altogether, five reactors are scheduled to be completed by 1958.

The Allis-Chalmers power plant, to be built on the Argonne National Laboratory site near Lemont, Ill., will be designed to produce 20,000 kilowatts of heat and 5000 of power. Two other plants which have been authorized by AEC are a pressurized water reactor being built jointly by Westinghouse Electric Co. and Duquesne Light Co. near Pittsburgh, and a sodium-graphite reactor by North American Aviation and AEC.

Bell Aircraft Develops Titanium Scale Remover

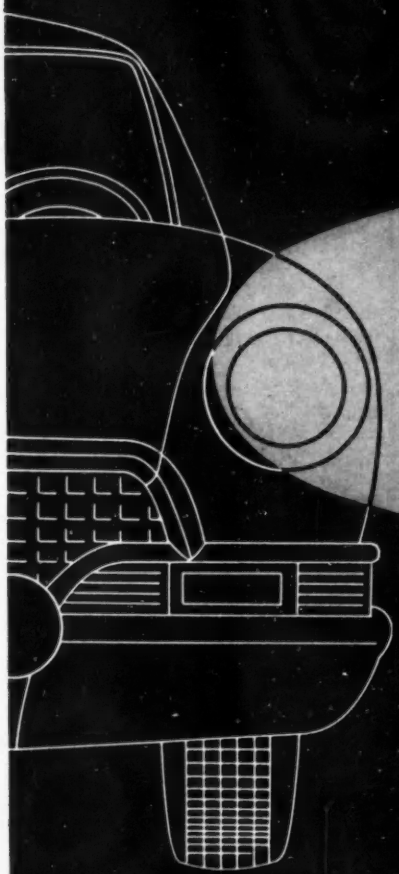
Bell Aircraft Corp. has developed a unit for removing scale from hot-formed titanium parts. It is expected to be in operation in the near future at Bell's main plant.

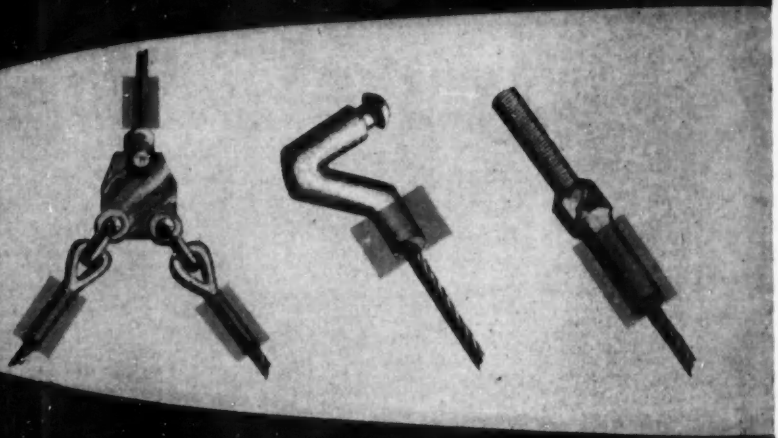
The entire process is remotely controlled by one man operating electrical controls in an enclosed booth. The unit has been incorporated into Bell's long-range program for increasing use of titanium in its aircraft and guided missiles.

(*Turn to page* 212, *please*)

YOU CAN SAVE

with BERGEN wire cables and assemblies...





Precision rotary swaging allows highest strength ratings

For many years Bergen Wire Rope Company has been supplying leading automotive manufacturers with cables, slings and assemblies to meet their most exacting requirements. Bergen's precision, rotary hydroformer molds the shafts of fittings to cables in perfect alignment which permits full strength ratings.

Bergen's modern plant is fully equipped with the latest types of machinery for swaging, pressing, tensile testing, proof testing, pre-stressing testing and laboratory development work.

- *Immediate shipments from large stocks.*
- *Quick deliveries can be made on short runs, special and unique constructions.*
- *Slings and assemblies can be furnished with spliced, socketed or swaged fittings.*

AUTOMOTIVE DIVISION

BERGEN

WIRE ROPE COMPANY 52 GREGG STREET, LODI, NEW JERSEY

"save with BERGEN"

Send for "Guide to Selecting Wire Rope"

New Designation System for Alloys of Aluminum

A NEW system of alloy designations for wrought aluminum and aluminum alloys has been developed by The Aluminum Association and became effective last month. It was officially approved by the Association at its 1954 summer meeting as "The Aluminum Association Alloy Designation System for Wrought Aluminum." Membership of The Aluminum Association accounts for all the primary aluminum produced in the United States and more than 85 per cent of wrought aluminum products. The temper designations in effect since 1947 are being continued without change and, as in the past, will follow the alloy designations.

The new system consists of four-digit numbers. The first digit of each designation indicates the general group to which a given alloy belongs. The last two digits identify the alloy or indicate the aluminum purity. The second digit indicates any modifications of the original alloy or impurity limits.

To aid in the transition from designations previously in use to the new system, many of the old numbers are retained as the last two digits of the new numbers. Thus, alloy 3S becomes 3003; 24S becomes 2024; and 61S becomes 6061.

In the very early days of the aluminum industry in this country, designation of alloys was a simple matter because there were few alloys and because few grades of purity were available. However, even at the turn of the century aluminum alloys were designated by a numerical system which was suitable for that time. As the alloys grew in number and type, it was necessary to broaden the system and to introduce a scheme of classification. For example, alloys were classified according to the predominating alloying elements present. Sheet was initially the only wrought aluminum product made on a large scale so the wrought alloy designations were followed by the letter "S." When wire and other wrought products began to be produced in the lightweight metal, the "S" designations were retained.

In time, various technical groups in the metallurgical and engineering fields adopted new systems of identifying aluminum alloys. New producers entering the industry during and following World War II added their special designations. In the meantime, the designations used in various governmental specifications brought still further confusion.

By providing a uniform set of designations broad enough to replace all of these systems, the new Aluminum Association system should bring this confusion to an end. Users will now be able to order by the same alloy number regardless of the supplier.

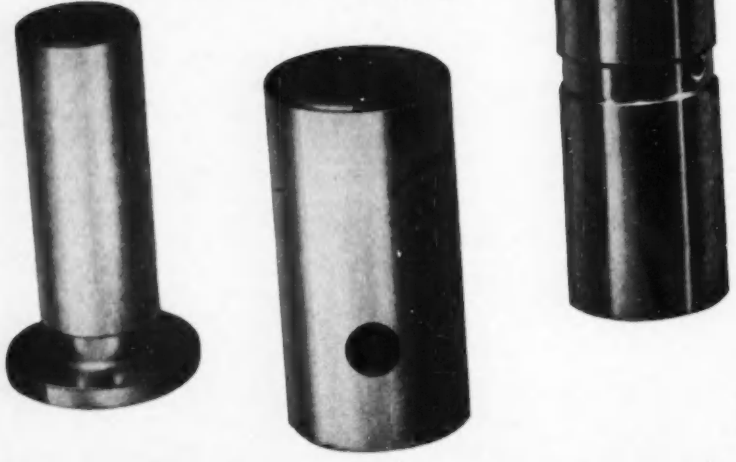
The general grouping of alloys under the new system is as follows:

Aluminum—99.00% minimum and greater		1xxx
	Major Alloying Element	
Aluminum alloys grouped by major alloying elements	Copper	2xxx
	Manganese	3xxx
	Silicon	4xxx
	Magnesium	5xxx
	Magnesium and Silicon	6xxx
	Zinc	7xxx
	Other element	8xxx
Unused series		9xxx

The 1xxx series, designating mini-

JOHNSON
Tappets
"fill the exacting requirements of today's engines"

Higher horsepower and higher compression put heavier loads on the tappets. Johnson quality assures you the performance you want from these vital engine parts.



"Tappets are our business"
JOHNSON Jp PRODUCTS INC.
MUSKEGON, MICHIGAN

Series 100 Open Motors are lighter in weight and take up to 30% less space than open motors of old NEMA frame sizes.

Series 100 TEFC Motors have same diameters as the Series 100 Open Motors, for easier interchangeability.

New Howell Series 100 open and TEFC motors have same diameters!

Howell's new re-rated motors save space, are easier to interchange! Feature double-shielded bearings . . . serve your needs better *all* ways.

If space ever limited your use of motors, here's welcome news: Series 100 Open and TEFC Motors have the same diameters! The reason? – Howell's exclusive ventilating system. This system cools *internally* providing 50% more contact between cooling air and active lamination materials. Result: you get motors that meet minimum space requirements . . . that run cooler than established ratings . . . that have increased load capacities – you get improved performance and longer life!

Less maintenance, too! New double-shielded bearings are standard on both the open and TEFC motors. These bearings seal grease in – dirt out. And where operating conditions are severe, you can re-grease them quickly, easily. Actual use proves these double-shielded bearings best for most applications; however, any type can be furnished.

Meet your special needs! New Series 100 Motors provide dependable copper rotors – three diameters for each frame size to assure design flexibility. Special corrosion-resistant materials and fittings are available.

Before you buy any re-rated motor, compare Howell's Series 100 Motors – for modern design, outstanding performance and precision engineering. Howell will continue to make a complete line of regular and special motors–with over 20,000 electrical design specifications to serve you. Call your Howell man today or write for Bulletin N-100!

HOWELL Red Band MOTORS

HOWELL MOTORS

Howell Electric Motors Company, Howell, Michigan

MOTORS FOR INDUSTRY SINCE 1915

Get all of these ✓ ADVANTAGES!

FAIRFIELD GEARS

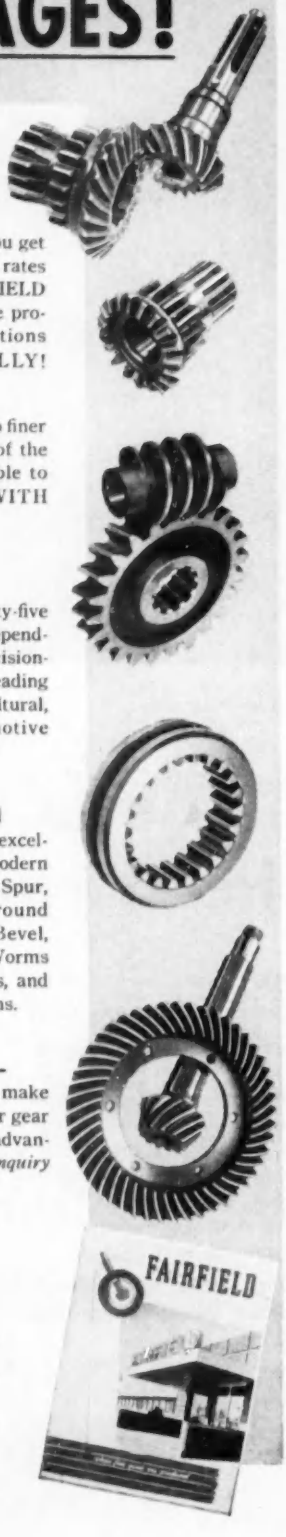
☑ **MASS PRODUCTION ECONOMY**—Large or small, you get the benefits of high production rates and big volume output at FAIRFIELD—the place where fine gears are produced to meet your specifications EFFICIENTLY, ECONOMICALLY!

☑ **QUALITY PLUS**—There is no finer recommendation for the quality of the product you sell than to be able to say that it is "EQUIPPED WITH FAIRFIELD GEARS!"

☑ **DEPENDABLE SOURCE OF SUPPLY**—For more than thirty-five years, Fairfield has served as a dependable, efficient supplier of precision-made, automotive type gears for leading builders of construction, agricultural, industrial, marine, and automotive equipment.

☑ **COMPLETE PRODUCTION FACILITIES**—Fairfield offers unexcelled facilities in a new and ultra-modern plant for producing finest quality Spur, Herringbone, Spiral Bevel, Ground Tooth Spiral Bevel, Straight Bevel, Coniflex Bevel, Hypoid, Zerol, Worms and Worm Gears, Splined Shafts, and Differentials to your specifications.

☑ **ENGINEERING SERVICE**—Fairfield engineers are qualified to make expert recommendations on your gear production requirements. Take advantage of the service offered. *Your inquiry will receive prompt attention.*



FAIRFIELD MANUFACTURING CO.

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Fine Gears Made to Order

Send for a copy of this illustrated bulletin describing Fairfield's facilities for making gears.

mum aluminum purities of 99.00 per cent and higher, differs basically from the other series. The last two digits indicate the minimum aluminum percentage. These digits are the same as the two digits to the right of the decimal point in the minimum aluminum percentage when it is expressed to the nearest 0.01 per cent. The second digit designates any modifications in the impurity limits. If the second digit is zero, it indicates that there is no special control on individual impurities; digits 1 through 9, assigned consecutively as needed, indicate special control of one or more impurities. Thus 1030 indicates 99.30 per cent minimum aluminum without special control of individual impurities, and 1130, 1230, 1330, etc., indicate the same purity with special control of one or more impurities.

The 2xxx through 8xxx series designate groups of alloys in which the following are major alloying elements: copper 2xxx; manganese 3xxx; silicon 4xxx; magnesium 5xxx; magnesium and silicon 6xxx; zinc 7xxx. The 8xxx series is used for major alloying elements other than the foregoing, and the 9xxx series is unused at present. In all of these groups, the last two digits have no special significance other than to identify the different alloys in the group. Generally they are the same as those formerly used to designate the alloy. For new alloys, the last two digits will be assigned consecutively beginning with xx01.

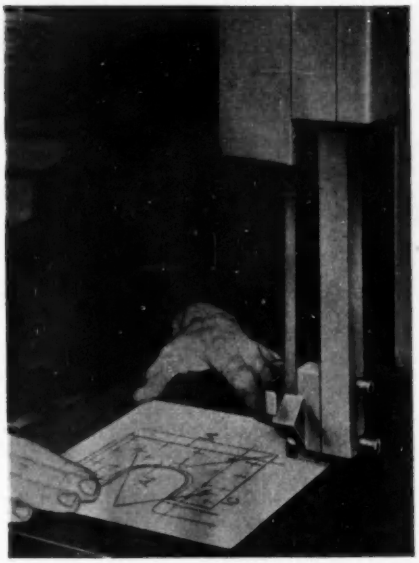
The second digit in the 2xxx-8xxx series indicates a modification of the alloy and replaces the letters commonly used for this purpose in the past. Thus, alloy 17S becomes 2017 and A17S, 2117; 18S becomes 2018 and B18S, 2218. Experimental alloys will continue to carry a prefix "X," which will be dropped when an alloy becomes standard.

The new system thus is not only fully adequate to cover all existing alloys but is also sufficiently flexible to meet any needs that can now be foreseen. The unused 9xxx series provides for additional designations should these be needed in the future.

LITERATURE

FUNDAMENTALS OF FRICTION AND LUBRICATION IN ENGINEERING, *published by American Society of Lubrication Engineers, 84 E. Randolph St., Chicago 1, Ill. Price, $3.50.* This publication contains 12 papers by world famous experts in their various fields. All published for the first time, include complete bibliographies with over 300 references.

Why Moly alloy steels are in your future

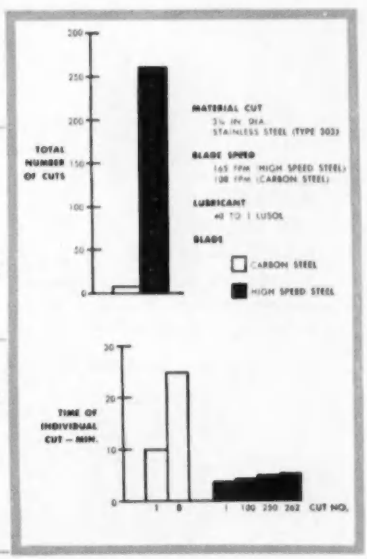


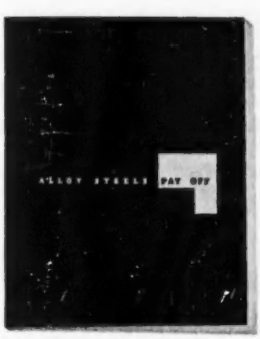
CUTTING LIFE INCREASED 10 TIMES

with

Moly tool steels

the part	**BAND SAWS**
the problem	Carbon-steel band-saw blades are usually made of a tool steel with about 1.25% C. For normal usage band saws make smoother and straighter cuts than hack saws. However, normal band saws run into difficulties when they're used as cut-off saws for materials with different machining properties.
the pay-off	The Henry G. Thompson & Son Company developed a moly high-speed steel, cut-off band-saw blade for stainless steel and other materials on a production basis. The chart shows graphically the results: cutting life of saw increased, time per cut shortened.





If you make, use, specify or buy steels you need a copy of "ALLOY STEELS PAY OFF"

Such topics as:

air valve stems on coal washers, anchor chain, annealing retorts, ball cages in universal joints, band saws, bolts, boring bars, bridges, bumpers for passenger cars, cable-tool and churn-drill bits, caustic evaporators, centralization feed pumps.

This big, fully documented 207 page book gives more than 50 complete case histories of alloy steel usage . . . such as outlined above. And each case history is an *idea*-starter of its own! Everything from "ANNEALING RETORTS" to "TRIMMER BLADES". Get your copy today. Address Dept. 7, on your letterhead, please. *Climax Molybdenum Company, 500 Fifth Avenue, New York 36, N.Y.*

This advertisement is printed in one shade of molybdenum orange, a pigment widely used for its striking color and good coverage — ideal for paint on industrial equipment . . . brings high visibility that means extra safety.

CLIMAX MOLYBDENUM

Impact of Automation Revealed at AIEE Conference

(*Continued from page* 100)

is the familiar electronic inspection machine which is capable of checking a large number of diverse characteristics of a part, automatically and at a high rate of speed. The Arlin line of such equipment was discussed by M. M. Arlin who also mentioned that he recently opened a new business called "Cybernetic Controls, Inc.," for the manufacture of electronic control devices for a variety of uses in automation setups.

Preventive Maintenance

Perhaps the most important aspect of automation is in the provisions for preventive maintenance as well as for handling unscheduled breakdowns. Some of the problems of a large automated plant were described by N. Conrad, Ford Motor Co. He said that many practices that worked before have had to be changed. For example, the huge Cleveland engine plant is operated exclusively on the basis of preventive maintenance. Moreover, it was found necessary to decentralize the maintenance department, the Cleveland plant being divided into five maintenance areas.

Even record keeping methods have had to be improved. Ford now relies entirely upon the IBM system which provides a quick guide to maintenance data on any machine in the plant.

An elaborate exposition of the most advanced methods for servicing electric motors was presented by J. H. Hosmer, Allis-Chalmers Mfg. Co. In addition to comments on preventive maintenance, the paper provided an extensive guide to trouble shooting.

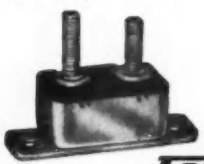
Is a preventive maintenance system mandatory for a manufacturing plant; does it pay off from the standpoint of management? Both questions were answered emphatically in the affirmative by Lewis P. Randall, Trenton plant, Ternstedt Div., GMC. Primarily an automobile hardware plant, with a die casting department comprising 32 machines with 250 to 750-ton locking pressure, it produces from 1500 to 1800 zinc base die castings per hour. With the installation of a formal preventive maintenance program in 1948, down time was reduced from an average of 14 per cent in 1947 to less than one per cent in 1949.

The system employed here includes schedules of inspection for each piece of equipment, job instruction sheets in sufficient detail, and comprehensive records kept on a Cardex system.

5 small parts to solve BIG PROBLEMS

Some of the smallest parts are big factors in helping a car earn and keep a good reputation.

FASCO
LOW PRESSURE INDICATING SWITCH
Dependable signal of dangerous low-pressure—as in engine lubricating or air brake systems.



FASCO
AUTOMATIC RESET CIRCUIT BREAKER
Precision calibrated—Permanent protection for electrical equipment —Instant mounting.

FASCO
DIRECTIONAL SIGNAL FLASHER
Compact—Rugged—Adaptable to all circuits—Safe—Economical (no fuse needed).

FASCO
HYDRAULIC STOPLIGHT SWITCH
Accurate—Extremely high safety factor—Proved through 26 years as standard original equipment.

FASCO
SERIES 400 PRESSURE SWITCH
Versatile (for low and medium pressure applications) — Reliable Available in many forms.

Fasco Electrical Equipment Serves the Automotive Industry

FASCO
INDUSTRIES, INC.
ROCHESTER 2, NEW YORK

BOOKS...

METHODS OF REASONING, *by P. D. Scott, published by Cleveland Engineering Society, 2136 East 19th St., Cleveland 15, O. Price, $1.00.* Here in an easily read booklet is the entire approach to the scientific method of reasoning. In condensing, popularizing and clarifying the method, the author has made the entire technique of problem solving and decision-making immediately available to the reader. Starting from the basic thought of what is reasoning, the booklet proceeds in a clear manner through easily assimilated steps covering the concept of the sensed difficulty, techniques of establishing the problem and how to state the approach and the method of arriving at sound solutions.

Before Hamilton Manufacturing Company put the original automatic home laundry clothes dryer on the market, they had their share of production headaches that go with pioneering a new product. Not the least of these was finding a steel sheet that would take the necessary drawing operations without leaving "stretcher strains" that made good cabinet finishing impossible.

Inland was one of the first steel companies to tackle the problem and come up with a solution. They developed a special aluminum killed steel that worked on the first Hamilton dryer sold, and works as well today when an automatic clothes dryer is standard equipment in practically every modern home.

Maybe Inland can "tailor-make" a steel that will help solve your production problems. Our metallurgical representatives are at your service!

INLAND **COLD ROLLED SHEETS**

INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois

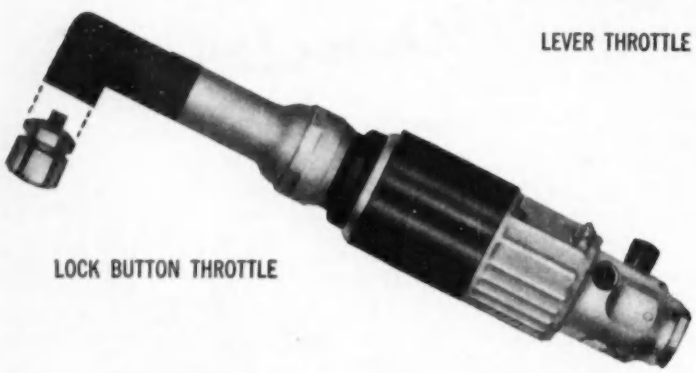
Sales Offices: Chicago • Milwaukee • St. Paul • Davenport • St. Louis • Kansas City • Indianapolis • Detroit • New York

Keep your eye on Buckeye

for everything new
in air and electric power tools!

HEAVY DUTY
90° ANGLE HEAD
DRILLS

LEVER THROTTLE



LOCK BUTTON THROTTLE

For HEAVY-DUTY applications—designed for minimum maintenance, built for maximum service. Compact, lightweight, lowest overall head height—for ease of handling, even in the tight spots.

No exposed moving parts to create a hazard for tool operator or damage to the work piece. All working parts, including bevel gears, bearings and spindle, are separate units, easily and economically replaced—individually—when worn. Available with 1/4"-28 or 5/16"-24 thread; also with 1/4" capacity chuck.

Those are the facts about the NEW Buckeye 90° HEAVY-DUTY Angle Head Drills . . . we'll prove them, in your plant, without obligation. Just tell us where and when, we'll do the rest!

Buckeye Tools CORPORATION
DIVISION 21 • DAYTON 1, OHIO

producers of the world's first successful rotary air tools

Industry News

(*Continued from page* 204)

SAE's Springer Award Goes to Young Author

The youngest sole author of a technical report published in the 1954 "Transactions" of the Society of Automotive Engineers recently was presented with the Russell S. Springer Award. The award was made to F. C. Matthaei, Jr., 28, secretary of American Metal Products Co., Detroit. Mr. Matthaei's paper is titled "Universal Positioning Seat Track."

I-H, Mack Get Orders For Trucks From Army

International Harvester Co. and Mack Mfg. Co. are the recipients of Army contracts totaling $50 million. The contracts call for the manufacture of 3000 five-ton trucks by I-H and 1630 of the same units by Mack.

International has been turning out the same trucks under an existing contract, while Mack has never produced such trucks for the Army. Both firms are scheduled to complete these contracts by early 1956.

Tenth of National Income Spent on Cars Each Year

The Dept. of Commerce reports that 26 cents out of every retail dollar was spent last year on automobiles and their upkeep, compared with 23 cents the preceding year. Ten per cent of the total U. S. national income goes for the purchase and operation of automobiles each year, according to the Twentieth Century Fund.

Goodyear Buys Brazil Site For a Rubber Plantation

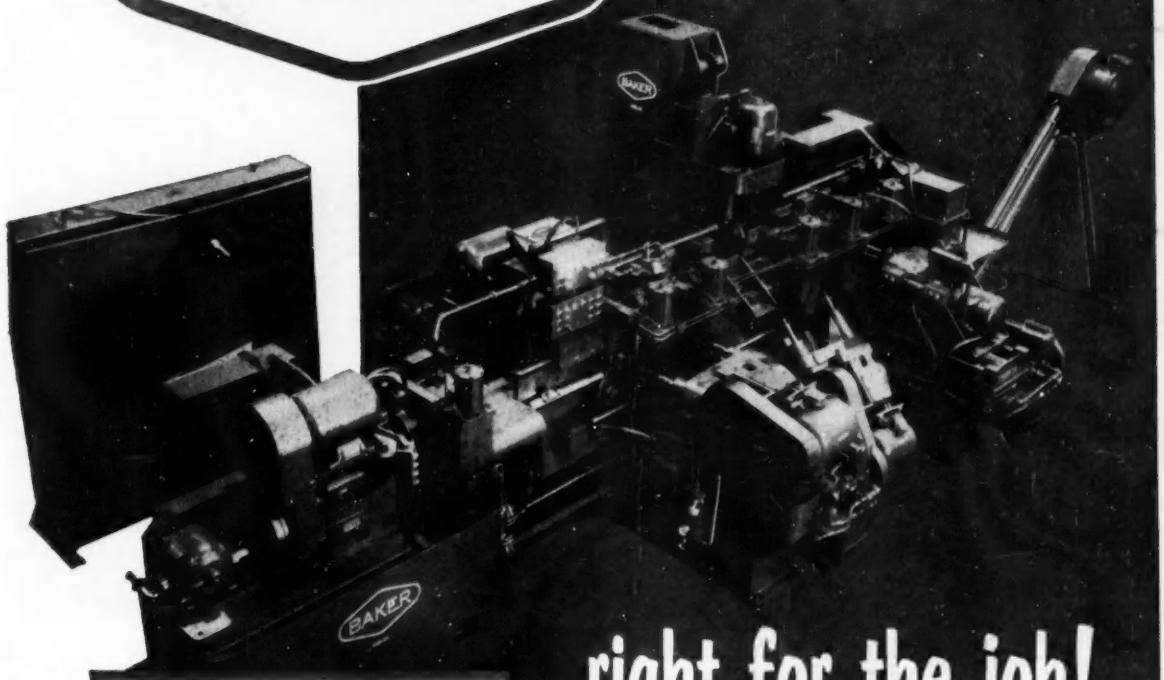
In order to help Brazil establish its own rubber-growing industry, Goodyear Tire & Rubber Co. has purchased an 11,000-acre site near the Amazon River and will develop the area gradually as a rubber plantation. It is also expected that the new plantation will eventually become a supplier for Goodyear's Sao Paulo tire plant.

Located 60 miles east of Belem, the site, presently undeveloped jungleland, is the first plantation the tire company has purchased in 20 years. When fully developed, the plantation would also provide a "living stockpile" of rubber for the U. S. in times of emergency, the company said.

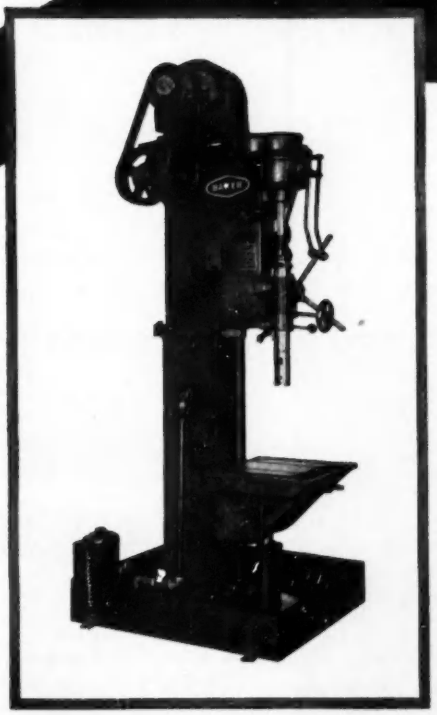
(*Turn to page* 216, *please*)

WHETHER LIGHT or HEAVY..
STANDARD or SPECIAL

BAKER has the drill..

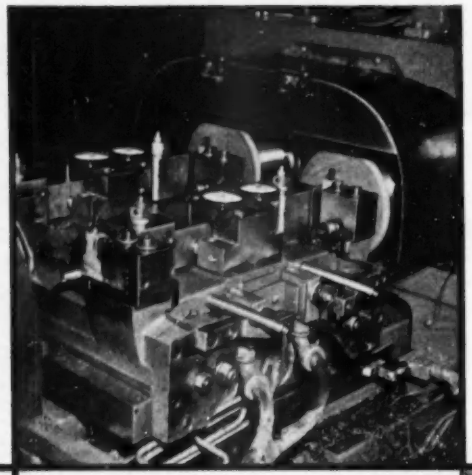


..right for the job!



Regardless of the job requirement, Baker engineers have the know-how to provide drilling machines that will do the job better! Where production figures are of primary importance, Baker will greatly increase productivity . . . and for standard drills over inch and a half capacity . . . there's a Baker *right for every job.* Consult Baker for better drilling machines, no obligation . . . and there is a qualified Baker Sales and Service Representative nearby who is eager to give you prompt and efficient service.

BAKER BROTHERS, INC. Toledo, Ohio
DRILLING...TAPPING...KEYSEATING and CONTOUR GRINDING MACHINES

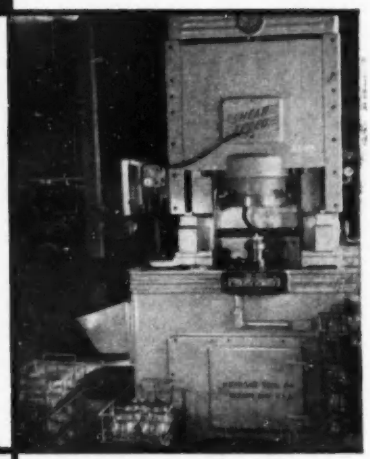


IF

YOU USE GEARS IN QUANTITY

MAKE AMGEARS WITH ALL OF THESE FACILITIES
YOUR GEAR DEPARTMENT

LOWER YOUR UNIT COSTS
WITHOUT INVESTING A DIME
FOR PRODUCTION EQUIPMENT



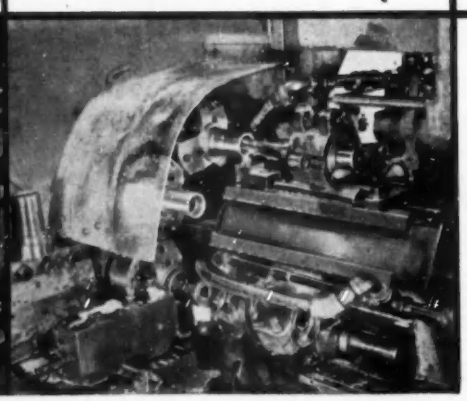
MULTIPLE
SPINDLE TURNING
HONING ... BORING
PLUS ...
HIGH SPEED GEAR CUTTING
GEAR SHAVING
TOOTH CHAMFERING

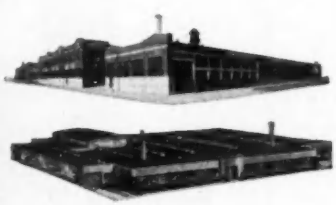
•

AIR SPEC
AUTOMOTIVE
AGRICULTURAL
GEARS

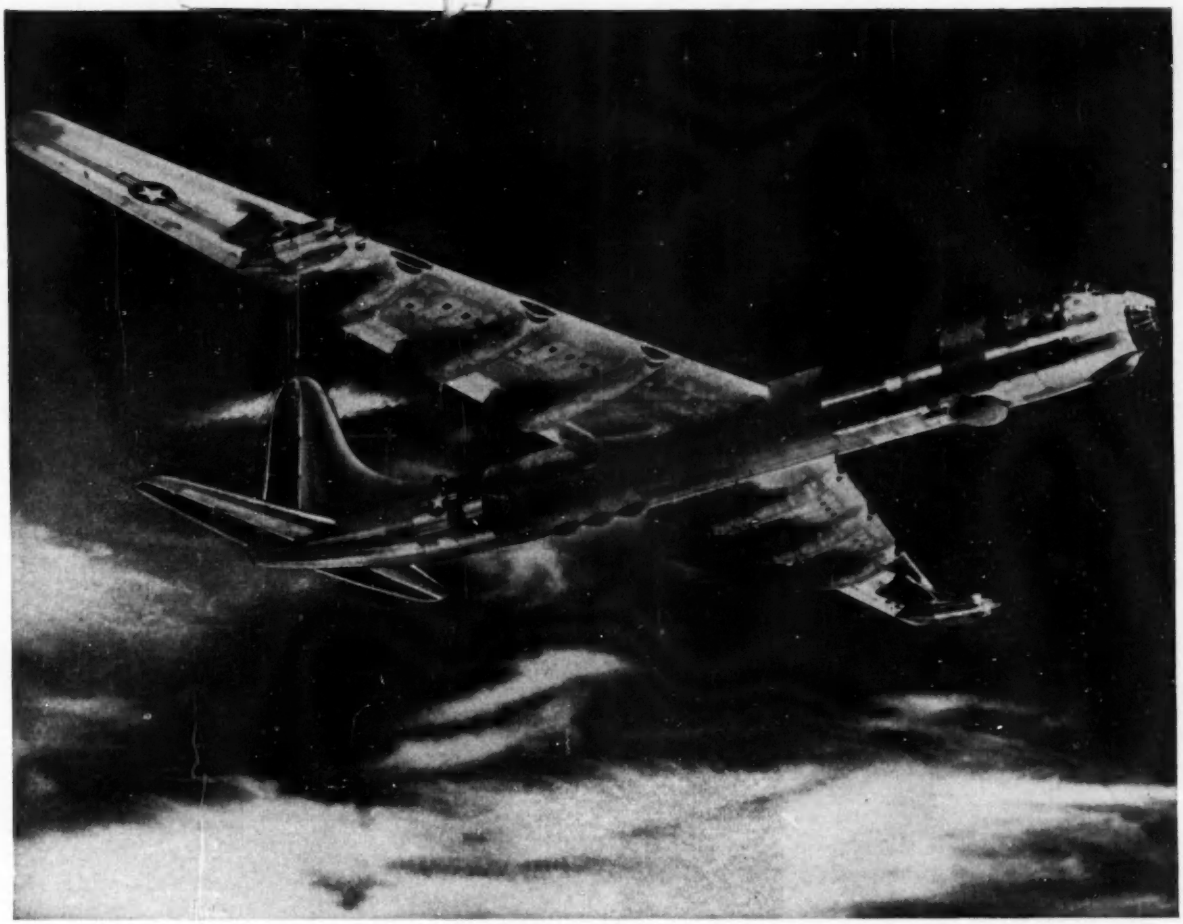
ACCURATELY MADE
AM gears, INC.
A SUBSIDIARY OF HUPP CORPORATION

CLEVELAND • DETROIT • CHICAGO





2 BIG PLANTS
Air Spec Gears and Gear Assemblies
CHICAGO 6633 W. 65TH STREET
DETROIT 7450 MELVILLE

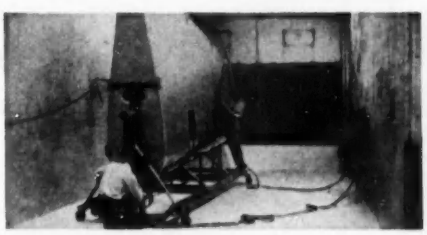


The plane that prevented a war

and TEMCO'S part in building it!

Convair's B-36's and the men of SAC were about all that stood between this country and its enemies in the late 1940's and early 1950's. Many feel that this team prevented a third World War. Today, as then, they are powerful deterents to any would be aggressor. Production of those giant planes required thousands of man hours and involved many problems. Convair helped simplify production by sub-contracting elevator, rudder, and door assemblies to TEMCO.

This is but one of many jobs wherein TEMCO has helped speed the Nation's defense effort. And it is one of the many jobs that has earned TEMCO the reputation for delivering a quality product, on schedule, at one of the lowest costs in the industry.



Giant B-36 elevator dwarfs TEMCO workers as it is wheeled into wet spray booth for its last coat of paint before being shipped to Convair, Ft. Worth, for final assembly.

TEMCO
AIRCRAFT CORPORATION
DALLAS, TEXAS

Industry News

(*Continued from page* 212)

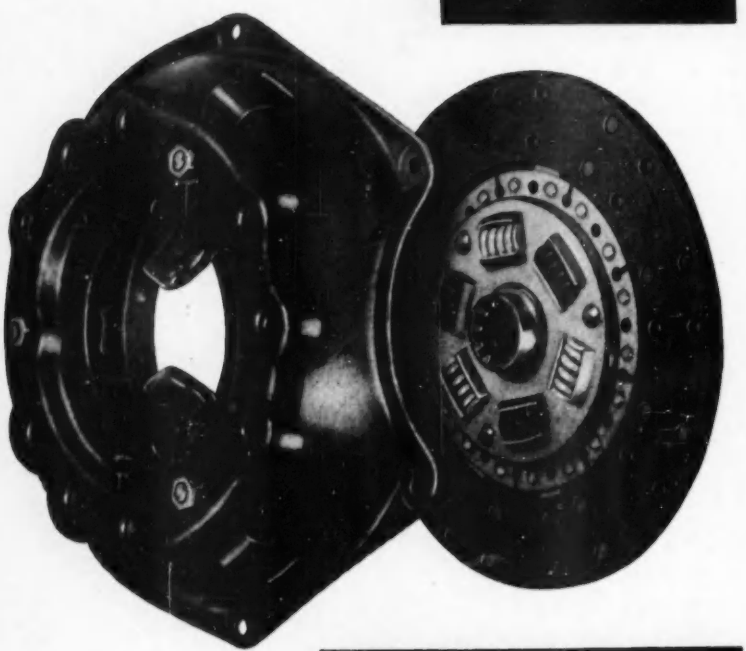
Thompson Chairman Named Industrialist of Year

Industrialist of the year, as selected by the Society of Industrial Realtors, is Frederick C. Crawford, chairman of the board of Thompson Products, Inc.

Mr. Crawford, an important contributor to the development of aeronautical science and a manufacturer of automotive and aircraft parts and accessories, was recently chosen for the honor. Presentation of a statuette symbolizing achievement in industry was made in Cleveland on Nov. 10.

The honoree is president of the National Aircraft Show. For the past 20 years he has awarded the Thompson Trophy to the winner of the world's speed classic at the national air races.

Engineered by Borg & Beck... means MAXIMUM PERFORMANCE MINIMUM MAINTENANCE!



You can depend on BORG & BECK

CLUTCHES ..FOR THAT VITAL SPOT WHERE POWER TAKES HOLD OF THE LOAD!

BW

Reg. U.S. Pat. Off.

BORG & BECK DIVISION • BORG-WARNER CORPORATION

Chicago 38, Illinois

Ford Uses Electronic Unit To Inspect Exhaust Valves

Ford Motor Co.'s Northville, Mich., plant has installed electronic "inspectors" to check precision-ground exhaust valves in overhead-valve engines.

The valves are injected into the automatic inspector at the rate of 3000 an hour. In the machine, the length and diameter of the valve stem are measured. The relationship of the head to the stem is checked, and the seat of the valve head is inspected for foundry or machining defects. A "memory" unit in the device decides if a detected flaw can be corrected by additional machining.

After the valves are ejected from the machine, they are sorted to minute differences in size. The inspecting device divides the approved valves in the plus and minus halves of the allowed one thousandth of an inch tolerance and sends each group into separate chutes, where approved valves in each group are stamped red or green. The colors later aid engine assemblers to select exhaust valves of the exact size.

McCulloch to Distribute Supercharger Nationally

Plans for national distribution of McCulloch superchargers, which are claimed to increase automobile engine horsepower by approximately 35 per cent, have been announced by McCulloch Motors Corp. Paxton Products of Inglewood, Calif., has been named national distributor.

The company will first offer supercharger dealerships to Ford, Mercury, and Lincoln new car dealers throughout the U. S., Canada, and Mexico. Complete supercharger installation kits for recent models of these cars are available now, and kits for other makes are in preparation.

North American to Build Additional Sabre Planes

Additional F-100 Super Sabre jet fighters are to be built at an accelerated rate for the Air Force. North American Aviation, Inc., will set up a second line for assembly of the speedy fighters at its Columbus, O., plant, under a new $100 million air force contract. First deliveries from this line are scheduled for the fall of 1955.

North American has been building the F-100 at its Los Angeles plant since last October. About 200 of the planes were on order before the new contract was signed.

DEMAND FOR KS SPEEDOMETER UP 160% IN 6 YEARS

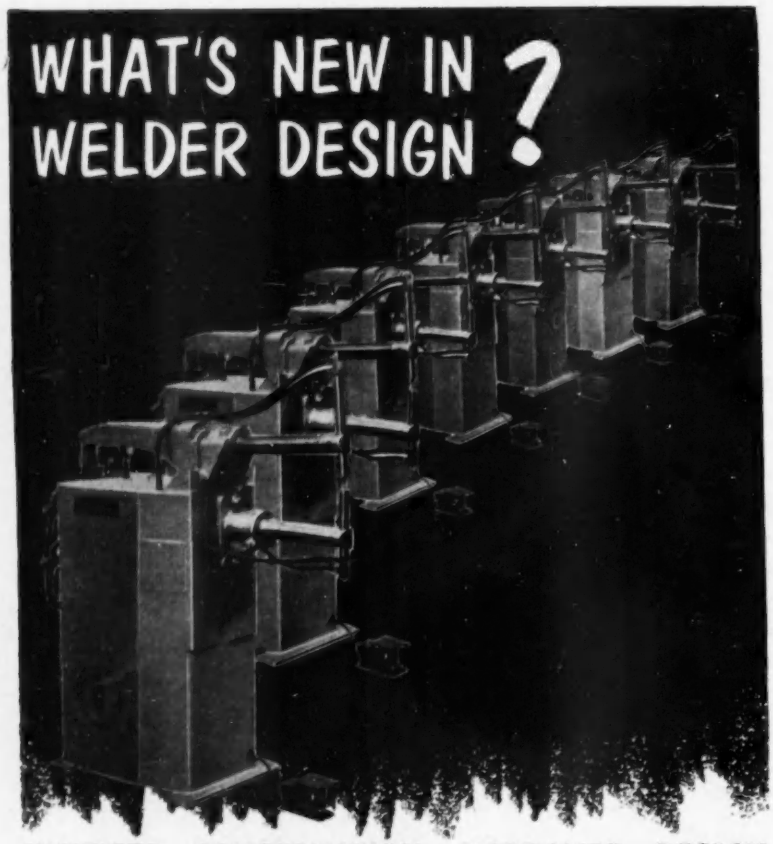
Early in 1948 King-Seeley completed the development and testing of a new speedometer design using a Cunife magnet. King-Seeley adopted this magnet material because of its inherent stability and imperviousness to shock, vibration, temperature variations and stray magnetic fields.

The general acceptance of this new design has been more than gratifying. Production has increased 160 per cent since its adoption and three new accounts have been added to the list of original equipment users.

This is the automotive industry's recognition of an instrument that has won the car owner's complete approval.

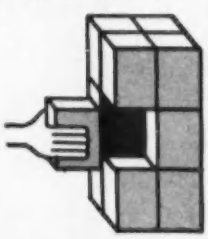
KING-SEELEY CORPORATION
ANN ARBOR, MICHIGAN
Plants at ANN ARBOR, SCIO and YPSILANTI

WHAT'S NEW IN WELDER DESIGN?



UNITIZED CONSTRUCTION, IMPROVED DESIGN of Federal's Rocker-Arm Spot Welder MEANS BETTER WELDS, FASTER, LOWER UPKEEP

UNITIZED DESIGN
A Federal Exclusive!



Component parts of each system are sectionized and mounted on individual, removable panels. Normal "down-time" is reduced to an absolute minimum; maintenance greatly simplified.

Federal's New Rocker Arm Spot Welders—redesigned from base to tip—to deliver highest production with a minimum of operating and maintenance costs. Feature for feature they are the outstanding low cost spot welders of this type available today.

Here's a few of the many features: Unitized Design, built in sections for easy maintenance and interchangeability; More Space, tapered frame permits greater working areas; Compact Construction, trims bulk—all lines are outside frame—easily accessible without unsightly and dangerous protrusions; Ferrule Fittings, with threaded couplings, permit quick, simple disconnect of all water and air connections; Low Loss Cylinder of new design boosts efficiency as does the new style Low Inertia, streamlined Horn Raising Lever. It's all new! It's welding efficiency at it's finest. It's another reason why welding engineers trust "Federal—First in Resistance Welding."

THE FEDERAL MACHINE AND WELDER COMPANY

WARREN, OHIO

Federal WELDERS

Warco PRESSES

AIRBRIEFS

(*Continued from page* 98)

nuclear aircraft engine research program at Pratt & Whitney Aircraft. The company has been engaged in atomic engine work for the past three years, and the Atomic Energy Commission has allocated $8.6 million to P&W during the current fiscal year. AEC also has extensive laboratory facilities and research programs underway at the Evendale, O., plant of General Electric Co. Initial obligation for the Hartford Research Facility is $7.5 million for acquisition of land and initial construction.

Jet Age Rapid

The dizzy rate of jet aircraft progress is brought home with announcement that a Lockheed F-80 Shooting Star is to be placed in the Air Force Technical Museum at Dayton, O. The F-80 was the first U. S. combat jet fighter and established a world's speed record of 623.8 mph in 1947.

Heavy Press Program

After countless fits and starts, the USAF heavy press program has finally been crystallized, and nine units are scheduled. The first, a 13,200-ton extrusion press, is already in operation at Alcoa's facility in Lafayette, Ind. Alcoa-Cleveland will receive a 50,000-ton unit next February, and a 35,000-ton press will go into operation at Wyman-Gordon, Worcester, Mass., early next spring. Other presses include: 8000-ton extrusion unit at Kaiser, Halethorp, Md.; 12,000-ton extrusion press at Harvey Machine, Torrance, Calif.; and 12,000-ton twin at Curtiss-Wright, Buffalo, N. Y.

Small Jets

Fairchild Engine & Airplane Corp. and General Electric Co. have been declared winners of the recent USAF competition for development of a "low thrust" turbojet engine for use in missiles and target drones. The two companies won out over a dozen competing designs. Details of the winning engines are not revealed, but they are believed to produce thrust in the neighborhood of 2500 lb.

Turboprop Convair

Following the decision of Capital Airlines to purchase the turboprop-powered Vickers Viscount transport, Convair has been energetically studying various turboprop versions of the popular Liner transport. The com-

MURRAY-WAY the automatic way the economical way the better way

to POLISH . . . BUFF . . . GRIND . . . FILTER

Whatever your job . . . whatever your problem . . . Murray-Way automatic equipment will do that job better and more economically.

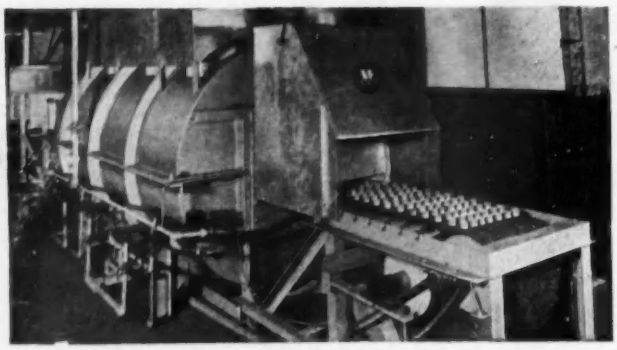
These are just a few illustrations of Murray-Way's success in beating production cost with the finest automatic equipment available.

You can depend on Murray-Way engineering, Murray-Way experience, Murray-Way equipment to solve your production problems.

A. Micro-Polish—Continuous Strip Polishing Installation
B. Vertical-Platen Conveyor
C. Horizontal-Platen Conveyor
D. #51 Universal Polishing Head —One of Several Standard Polishing Heads
E. The Automatic, Self-Cleaning, Compact Filter
F. #72 Series Belt Polishing Head
G. Indexing Dial Table
H. Six Micro-Polish Units in Series

P. O. Box 180, Maple Road, E.
Birmingham, Michigan

MURRAY WAY CORPORATION



An EF Gas Fired Cylindrical Muffle Continuous Furnace—one of numerous sizes and types we have built for sintering iron and non-ferrous powder products.

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THE ELECTRIC FURNACE CO.
FOR FERROUS AND NON-FERROUS SINTERING FURNACES THAT PROVIDE FOR . . .

(a) maximum pounds of quality product per dollar of investment.
(b) lowest cost per pound for the sintering operation.
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Extensive experience in all heat processing phases in connection with powder metallurgy has enabled EF engineers to develop equipment for producing some really outstanding results.

We would like to discuss some of our latest furnace developments with you, if interested.

Gas-Fired, Oil-Fired EF and Electric Furnaces
for any Process, Product or Production
THE ELECTRIC FURNACE CO.
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DEKA BORE

saves 80% of boring time

DEKA-BORE (and only DEKA-BORE) can be adjusted in fractions of 1/10,000" on the full diameter as easily as reading 1/16" on a steel rule. NOT A VERNIER OR SCROLL ADJUSTMENT. Can be calibrated in increments of .00005 on radii or .0001 on diameter as easily as picking up .002 on a conventional micrometer dial.

100% GUARANTEED!

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☐ Name of nearest DEKA-BORE distributor, who will arrange free demonstration.
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pany has already developed versions powered by two Allison T38 units over the past three years. LACSA, a Costa Rican airline, is discussing with Convair the experimental installation of four Rolls-Royce Dart engines, the same as used in the Viscount, in one of the two Model 340 transports it has ordered. A Convair Liner will also be converted in England to take two Napier Eland turboprop engines in a development program.

Boeing 707 Progress

The Boeing 707, this nation's first civil jet airliner, which will be produced initially as a military tanker, has completed its initial flight test program with flying colors. The first phase of the program was to encompass a 50-hr series of tests, but all of the trials were completed in only 43 hr and 27 min of flight time. The tests have resulted in modifications to the nose contour to improve pilot visibility, changes in the shape of the engine pods, and addition of a belly air scoop to provide air for a turbine-powered auxiliary powerplant.

Industry Backlog Drops

The aircraft manufacturing industry backlog of orders now stands at approximately $15.3 billion—a reduction of five per cent over the first quarter of this year but a 19 per cent reduction over the same (second quarter) period of last year. Complete aircraft and parts account for 70 per cent of the backlog, engines and parts for 22 per cent, and propellers and parts for one per cent of the total; the remainder is accounted for by miscellaneous development programs. Military orders account for 94 per cent of the airframe orders, 97 per cent of the engine orders, and 87 per cent of the propeller orders.

BOOKS . . .

THE FOUR WHEEL DRIVE STORY. *by Howard William Troyer, published by McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y. Price, $4.00.* The history of the Four Wheel Drive Auto Co. makes a story that flows over the usual limits of a company history. Warmly stirring, this dramatic narrative pays long overdue tribute to the vital role of the motor truck in our country's growth. At the same time it honors the American community spirit of enterprise that made such a story possible. Parallel to the story of motor trucks in this book runs the story of one of the country's foremost community enterprises. How the company grew, met and weathered adversity, is a fascinating story, told here with all of its humor, excitement, and suspense.

Next time you design a part—stop and think—

CAN IT BE BETTER MADE WITH ALUMINUM?

EACH of the 20 parts shown above can be better made with aluminum because aluminum offers unique properties in many different combinations.

For example, aluminum's corrosion resistance adds longer life. Aluminum's ability to conduct heat readily is invaluable in handling increased temperatures. Combined with its great weight saving advantage, aluminum aids designers in meeting the demands of today's power-conscious public.

You can also maintain manufacturing economy because aluminum's workability makes it easy to fabricate, often at far less cost than other materials. It can be stretched, rolled, cast, drawn, forged, spun, stamped, extruded, and machined to make a wide variety of parts economically.

And aluminum gives you big price savings over other non-ferrous metals, because its light weight gives up to 3 times more metal per pound!

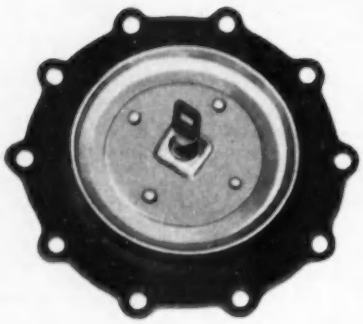
You can plan now to use aluminum with assurance of continuing, dependable supply in any quantity or form you require. For the vast expansion of the aluminum industry makes aluminum one of the most plentiful of metals.

As America's fastest growing producer of aluminum, we believe we are ideally equipped to work with you. For complete information, contact Kaiser Aluminum & Chemical Sales, Inc. *General Sales Office,* Palmolive Bldg., Chicago 11, Illinois. *Executive Office,* Kaiser Bldg., Oakland 12, California.

Kaiser Aluminum

Setting the pace . . . in growth, quality and service

NO MECHANICAL FAILURE



In current tests being conducted by a leading manufacturer of fuel pumps for original equipment, HAARTZ-MASON material has already withstood ten months of mechanical breakdown testing without failure.

HAARTZ-MASON brings 30 years of experience in quality coated fabrics to the automotive and aviation industries. The Mechanical Products Division is completely equipped to supply the requirements of the automotive and aviation industries with precision molded diaphragms and quality coated fabrics.

HAARTZ-MASON, INC.
MECHANICAL PRODUCTS DIVISION
Watertown 72, Massachusetts

Detroit Representative: J. Earl Fraser Co.
413 Fisher Building, Detroit, Michigan

HAARTZ-MASON, INC.
Watertown 72, Massachusetts

Gentlemen: Please send catalog covering all types of diaphragms for the automotive and aviation industries.

To .....

Street .....Zone .....

State .....

Business Pulse

(*Continued from page* 96)

The spending rise from the second to the third quarter occurred despite the fact that personal disposable income is estimated by the CEA to have declined by about $400 million. Thus the higher consumption total was due entirely to a reduction in the rate of personal saving. Specifically, the rate of saving is estimated to have declined from 7.8 per cent of disposable income in the second quarter to 7.3 per cent in the third quarter. The declining tendency of the savings rate has been one of the most important developments on the business scene this year. And since the third-quarter rate, though the lowest in two years, was still higher than many economists view as normal, there would seem to be further leeway for reduction.

Gross national product, according to CEA estimates, remained unchanged at a seasonally adjusted annual rate of $356 billion between the second and third quarter. Indeed, it has shown virtually no change through 1954 to date.

Comparison of gross national product components for the second quarter of 1953—when business activity was at its all-time peak—and the third quarter of 1954 reveals a good deal about the nature of the business decline which has occurred.

At a seasonally adjusted annual rate of $49.3 billion in the third quarter of this year, Federal outlays were running almost $13 billion below their peak rate reached in the second quarter of 1953. This, considered by itself, has been a powerful recessionary influence. The second most important single downward force was the change from net inventory investment by business to net inventory liquidation. Whereas business was adding to inventories at an annual rate of $5.4 billion in the second quarter of 1953, it was liquidating stocks at an annual rate of $4.0 billion by the third quarter of this year, the net change from accumulation to liquidation amounting to almost $10 billion. The combined reduction in the Federal Government and inventory components of gross national product thus amounted to $23 billion over the period.

Total gross national product did not decrease by this full amount, of course. Offsetting increases occurred in other components. Personal consumption expenditures increased by $3.2 billion (about two-thirds of which is attributable to higher disposable income, and one-third to the decline in the savings rate); outlay by State and local governments rose by $2.8 billion; private construction rose by $2.1 billion; and our net foreign position improved by $2.8 billion.

Thus, even though there was some decline in investment in producers' equipment from the second quarter of 1953 to the third quarter of this year, the net reduction in total gross national product for the period amounted to only $14 billion, or about 3¾ per cent.

Classified Advertisements

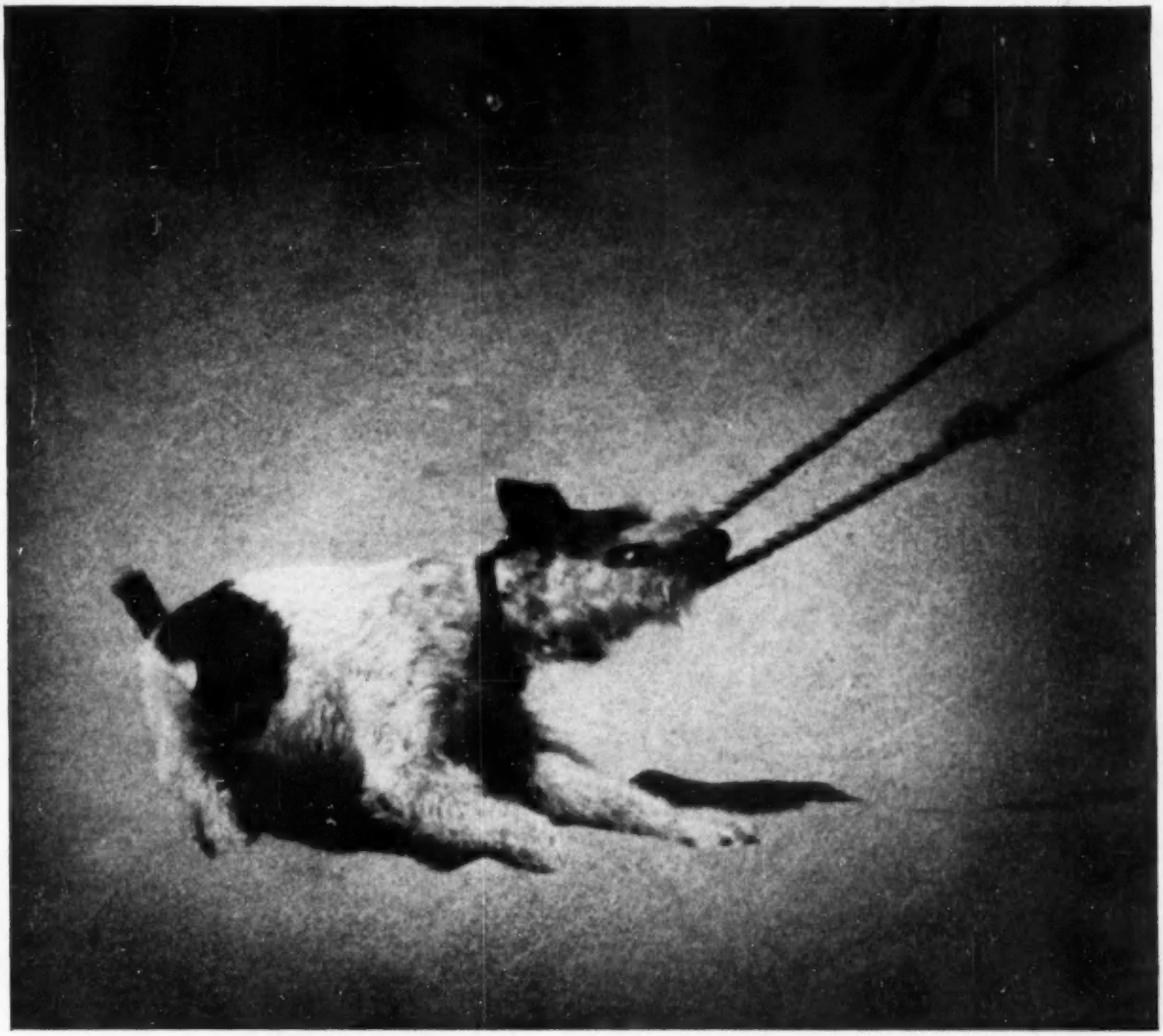
Metalworking Manufacturers! DEVINE AUTOMATIC BUFFING & POLISHING MACHINE. No Reasonable Offer Refused! Urgent, immediate need for additional factory space necessitates quick sale of Devine 4 Stage Automatic Straight Line Polishing & Buffing Machine. Like new! Perfect condition. Equipped with 4 adjustable wheel heads (each with 20 H.P. motor), & 45' long conveyor with 20 H.P. motor. Extremely useful in the automatic finishing of many metal parts such as: bumpers, grilles, typewriter bars, pliers, wrenches, hardware, etc. Original cost, over $18,000. Sacrifice! Photos available, or inspect at our premises. Box #87, Automotive Industries, 5601 Chestnut St., Philadelphia 39, Pa.

POSITIONS FOR AUTOMOTIVE EXECUTIVES, $5,000-$50,000. The nation's largest executive agency presents an exclusive service for men in the automotive, aircraft and allied industries. This is a confidential, professional and rapid service for the nation-wide placement of successful men under 45 in the engineering, technical, sales and administrative fields. Send a short resume including age, education and work history and we will tell you by return mail what we have available for you and how we can help. Write to Graebner's Detroit Automotive Exchange, 548 Buhl Building, Detroit 26, Mich.; offices in Detroit, Chicago and Minneapolis.

BOOKS . . .

HANDBOOK OF INDUSTRIAL SAFETY STANDARDS, *published by Association of Casualty & Surety Companies, 60 John St., New York 38, N. Y. Price, $1.40.* The ninth edition of this handbook includes several new chapters, illustrations, and tables in its 315 pages. It is a concise but comprehensive compilation of industrial safety requirements recommended by nationally recognized authorities. However, much of the text material is an amplification and extension of the various codes on which it is based, and some sections deal entirely with topics not covered by any existing standards.

PROBLEMS IN ANTI-RECESSION POLICY, *published by Committee for Economic Development, 444 Madison Ave., New York 22, N. Y. Price, $1.00.* Various aspects of economic recessions and of policies to deal with them are examined in this book. The 161-page volume presents 11 memoranda by outstanding business and university economists who prepared them for CED's Research and Policy Committee.



BONDERITE holds paint to metal!

There's a constant tug-of-war between corrosive action and the paint finish on your metal products. The paint tries to stick to the metal; the natural forces of corrosion try to lift it off.

Bonderite is the "anchor man", throwing its strength on the side of lasting, durable paint finishes.

This excellent product, simple and economical in operation and uniformly effective in results, creates a nonmetallic coating integral with the metal surfaces. The coating anchors organic finishes, is a stout corrosion resistant, and prevents the spread of finish failure should the paint film be broken by scratch or dent.

Bonderite adds quality to painted metal products by lengthening the durability and appearance life of paint finishes. Bonderite adds sales appeal because your customers know about it and the benefits it brings.

Investigate Bonderite for your product NOW! Write or call.

*Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

PROTECTED BY Bonderite PARKER RUST PROOF CO. QUALITY CORROSION RESISTANT

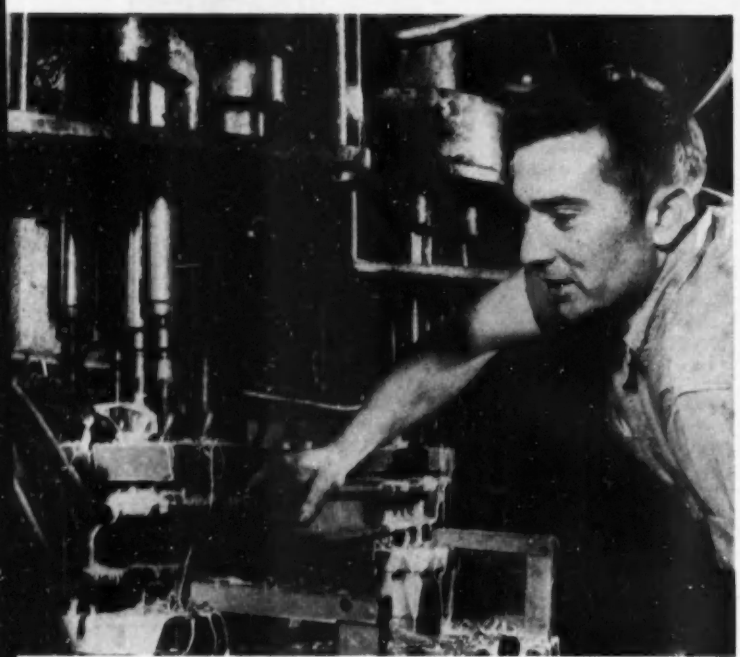
Since 1915—Leader in the Field

PARKER RUST PROOF COMPANY

2178 E. Milwaukee, Detroit 11, Michigan

BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE	TROPICAL
corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces	heavy duty maintenance paints since 1883

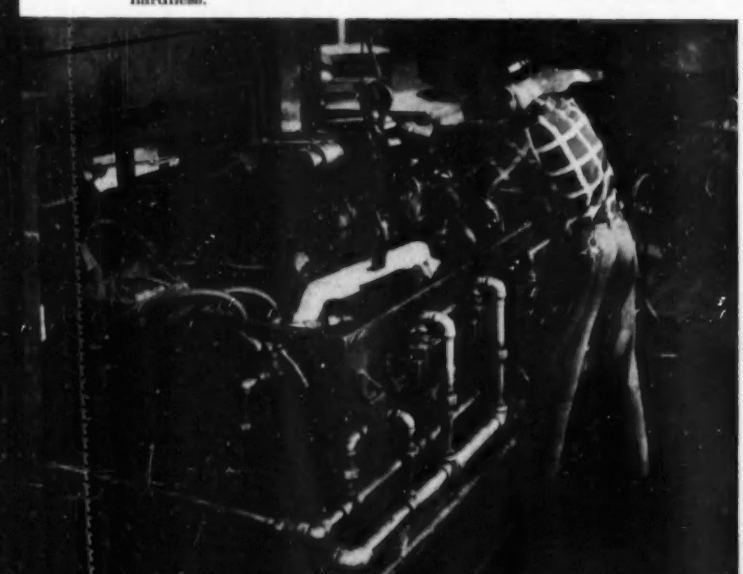
For trucks that must "roll until



Multiple spindle drilling of 10 clip holes in the front axle spring pads. The particular CARILLOY Steel used for these parts has good strength and toughness, but is easy to drill and helps keep down tool costs.

Forged axles are heated, quenched and tempered to obtain desired hardness and strength. CARILLOY Steel is easy to heat treat to the desired hardness.

Final assembly of finished axles prior to painting and shipping. They will be used in heavy duty trucks that encounter severe off-road service. The necessary durability can be obtained only with a high quality alloy steel.



USS Carilloy Steel gives heavy-duty front axles needed strength, toughness and impact resistance

● Fire trucks, garbage trucks, and municipal hauling equipment take a hard beating and must stay a long time on the job with minimum maintenance. Farm trucks and heavy-duty trucks used in mining and construction grind through mud, ruts, and open fields daily. Every part of this equipment has to be rugged . . . has to keep working continuously until the trucks are ready for the scrap heap. Rockwell Spring and Axle Company makes front axles for trucks like these; and to build in the needed durability, they use USS CARILLOY Steel extensively, not only for axles, but for steering knuckles and arms, steering knuckle pins, and steering arm ball studs. They use it everywhere that extra stamina is needed.

If your equipment must face up to severe service, if you want durability and resistance to abuse beyond the ordinary, specify USS CARILLOY Steels. You can get practically any combination of strength, toughness, and impact resistance . . . in a wide range of sizes, forms, and heat treatments . . . to *any* quality specification.

When you have any question about steel or its use, call in a USS Service Metallurgist for expert assistance.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Carilloy USS Steels

ELECTRIC FURNACE OR OPEN HEARTH

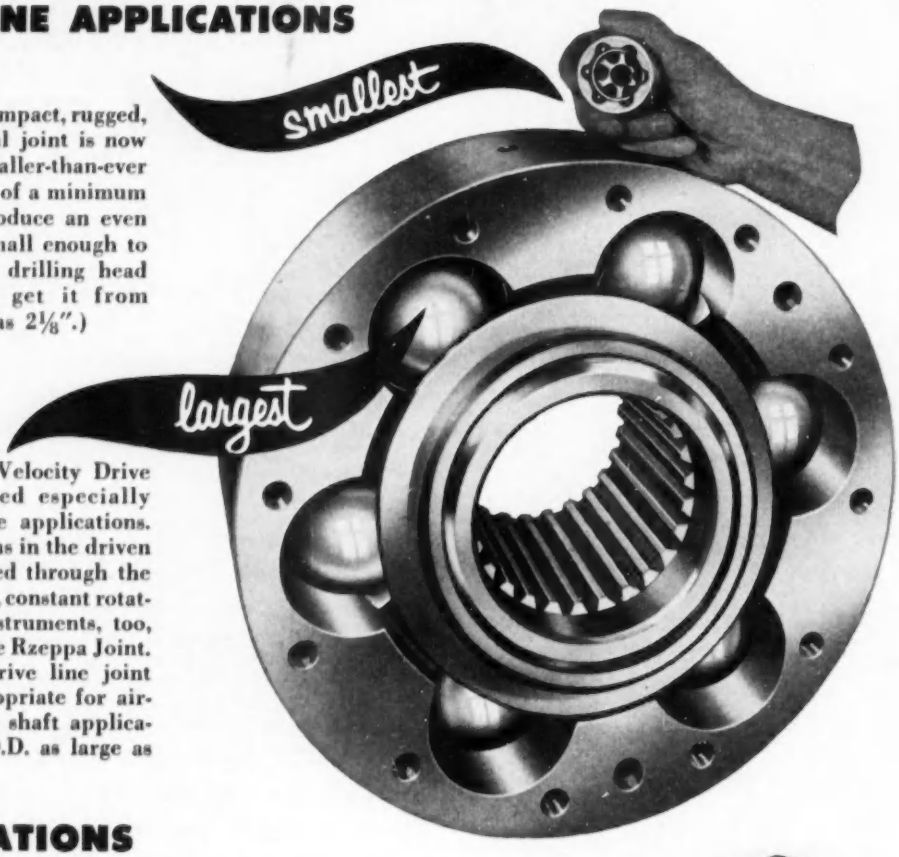
COMPLETE PRODUCTION FACILITIES IN CHICAGO OR PITTSBURGH

UNITED STATES STEEL

What's New in Constant Velocity UNIVERSAL JOINTS

FOR DRIVE LINE APPLICATIONS

Industry's demand for a compact, rugged, constant velocity universal joint is now being serviced with the smaller-than-ever Rzeppa. If you have need of a minimum weight joint that will produce an even flow of power—a joint small enough to be suitable for machine drilling head applications—you can get it from Rzeppa. (O.D. as small as 2⅛".)



Large Rzeppa Constant Velocity Drive Line Joints have proved especially capable on 4-wheel drive applications. Speed fluctuation problems in the driven shaft have been eliminated through the patented principle of true, constant rotating motion. Precision instruments, too, are making use of the large Rzeppa Joint. Should you require a drive line joint large enough to be appropriate for aircraft dynamometer drive shaft application, look to Rzeppa. (O.D. as large as 16".)

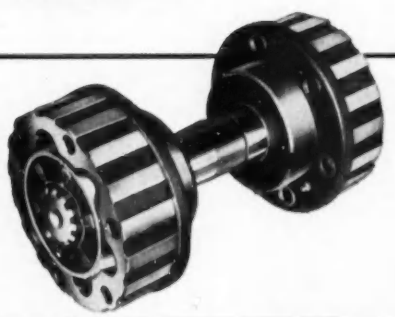
NEW APPLICATIONS

High angle efficiency, ruggedness, high capacity, and long life are among the reasons why Rzeppa Constant Velocity Joints are on the move. From the smallest to the largest they are being used on the drive lines of:

- Machine Tools
- Road Building Equipment
- Mining Equipment
- Steel Mill Equipment
- Oil Field Equipment
- Testing Instruments

TYPICAL DRIVE LINE APPLICATION:

Jointed shaft for independently sprung rear drive axle and propeller shafts for industrial applications. Solid or tubular shaft.



RZEPPA Constant Velocity UNIVERSAL JOINTS

E-4

For complete Rzeppa performance and engineering story—send for this catalog now.

The Gear Grinding Machine Company
3903 Christopher • Detroit 11, Michigan

GUNITE CAST WHEELS

for highway trucks and trailers

Assure yourself of minimum wheel and tire assembly time by using GUNITE Wheel Assemblies. Tire mounting requires no special tools . . . is quick, easy and simple. Six floating lug bolts firmly lock dual tires on the wheel. The stronger, lighter tubular-spoke of GUNITE design brings you a more efficient wheel with the proven strength of cast electric-steel. Write for complete information on GUNITE Wheels.

FERROUS CASTINGS FOR THE AUTOMOTIVE INDUSTRY

AUTOMOTIVE CASTINGS MADE TO YOUR SPECIFICATIONS.

GUNITE operates three ferrous foundries under one roof:

1. Gunite (Processed Gray Iron).
2. Malleable Iron.
3. Electric Steel.

Thus GUNITE can provide the best cast ferrous material to suit your requirements.

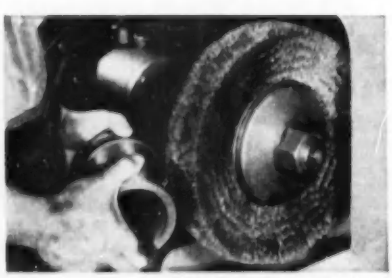
GUNITE FOUNDRIES CORPORATION

ESTABLISHED IN 1854 • ROCKFORD, ILLINOIS

OSBORN

Triples brush life

CAN AN **OBA** CUT YOUR COSTS?



Master of many jobs. *Because it can do so many different jobs, the Master Wheel is one of Osborn's most popular wire brush wheels. It is used extensively for finishing, cleaning, burr and scale removal. Here, it is being used at 3000 rpm to remove scale from a heat-treated part.*

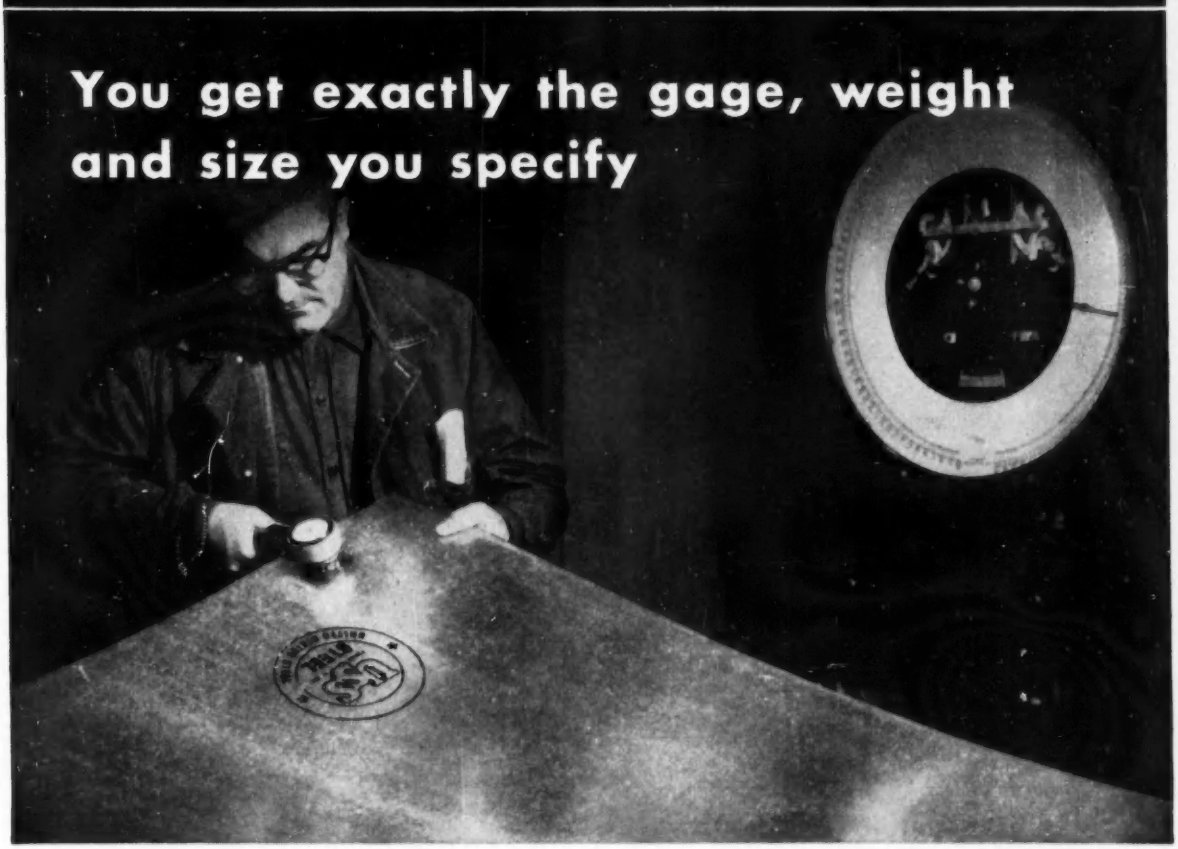
THE wire brush wheels formerly used for coating this pipe with concrete lasted a maximum of 115 pipe lengths. Now, Osborn Master Wheels coat 350 pipe lengths—a 3 to 1 superiority in service life. Longer brush life is typical of results obtained by an **O**sborn **B**rushing **A**nalysis.

Whether your operation is a special job like coating concrete . . . or any cleaning, finishing or burr removal applications, an **OBA** could help cut your costs. Have an Osborn Brushing Specialist analyze your operations and submit a confidential written report to you on how you can benefit with power brushing. An **OBA** costs you nothing. Call or write *The Osborn Manufacturing Company, Dept. E-23, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushing Analysis

TO HELP YOU DISCOVER HIGHER QUALITY AND LOWER COSTS WITH POWER BRUSHING

WHY IT PAYS TO BUY SHEETS and STRIP FROM US



● You can be sure you'll get sheets and strip that are accurate to specification at any U. S. Steel Supply warehouse. Every order—large and small—is carefully checked before it leaves the warehouse to make certain that you will get the exact weight, gage and dimensions you specified.

You can't go wrong with quality at U. S. Steel Supply. All our sheets and strip are top-quality United States Steel products—produced under close quality supervision every step of the way. It's good to know, too, that your emergency orders (to complete production runs) can be quickly filled by U. S. Steel Supply with the exact quality and specifications you need. You don't have to waste valuable production time if you run out.

Call us for: hot rolled, cold rolled, Vitrenamel, galvanized, galvannealed, corrugated, and long terne sheets; hot rolled or cold rolled strip.

TRIPLE SECURITY

What you want
When you want it
At the right price

U. S. STEEL SUPPLY
DIVISION

General Offices
208 So. La Salle St., Chicago 4, Ill.

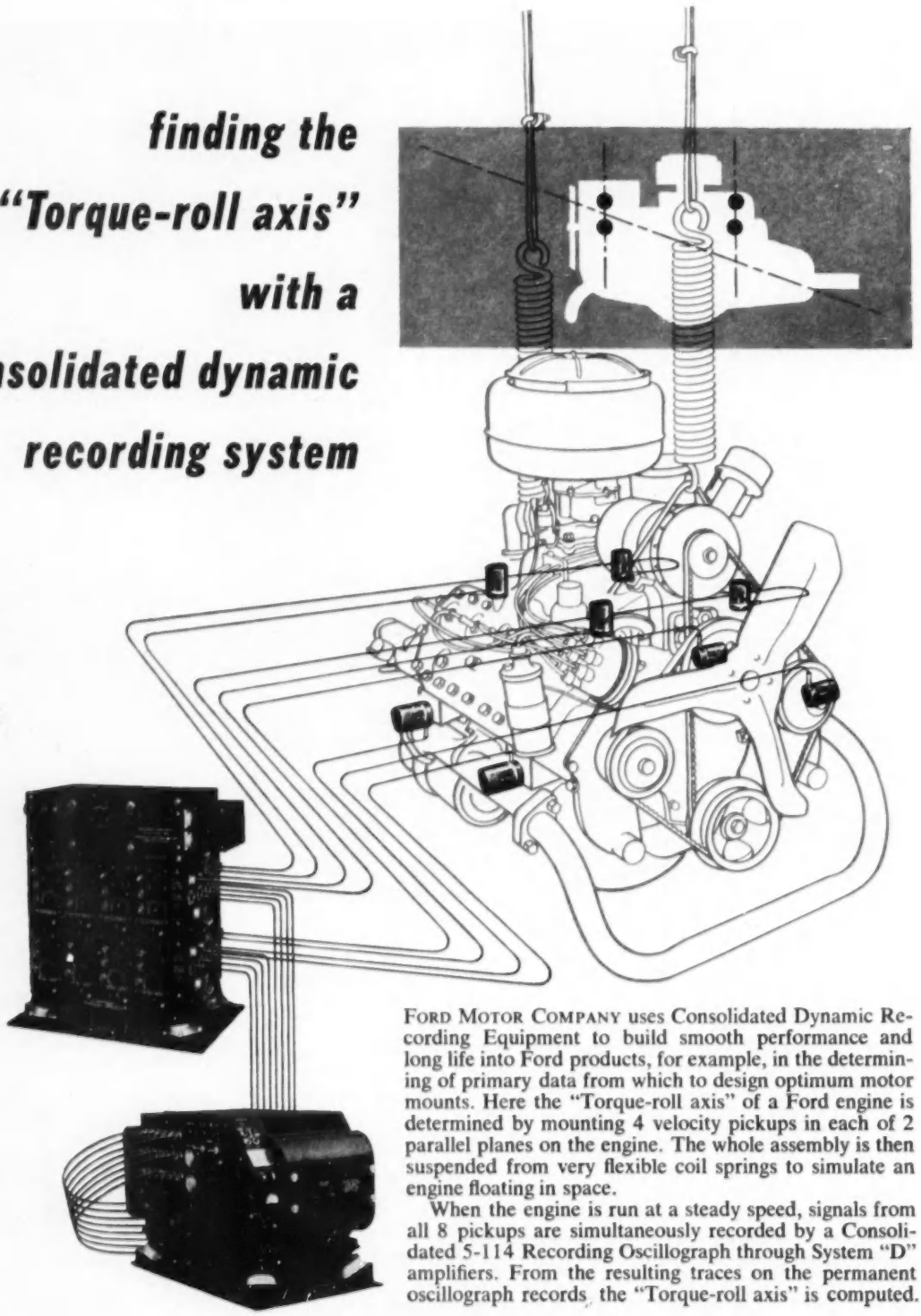
USS

Warehouses and Sales Offices
Coast to Coast

USS STEEL
UNITED STATES STEEL

UNITED STATES STEEL

finding the "Torque-roll axis" with a Consolidated dynamic recording system



FORD MOTOR COMPANY uses Consolidated Dynamic Recording Equipment to build smooth performance and long life into Ford products, for example, in the determining of primary data from which to design optimum motor mounts. Here the "Torque-roll axis" of a Ford engine is determined by mounting 4 velocity pickups in each of 2 parallel planes on the engine. The whole assembly is then suspended from very flexible coil springs to simulate an engine floating in space.

When the engine is run at a steady speed, signals from all 8 pickups are simultaneously recorded by a Consolidated 5-114 Recording Oscillograph through System "D" amplifiers. From the resulting traces on the permanent oscillograph records, the "Torque-roll axis" is computed.

Consolidated Engineering
CORPORATION
300 North Sierra Madre Villa, Pasadena 15, California

Sales and Service through **CEC INSTRUMENTS, INC.,** *a subsidiary with offices in: Pasadena, Atlanta, Chicago, Dallas, Detroit, New York, Philadelphia, Washington, D. C.*

analytical instruments for science and industry

Dynamic Recording Systems such as the one shown here have infinite variations in application and in the arrangement of the equipment. A typical recording system includes pickups, amplifiers, and a recording oscillograph. Write for Bulletin CEC 1500C-X18.

Here it is—

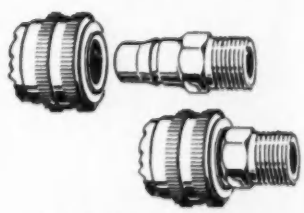
THE NEW HANSEN SERIES 3-RL QUICK-CONNECTIVE RING-LOCK COUPLING

Effectively handles far more volume than any coupling of equal dimensions

Tough, compact, smaller, the new Hansen Series 3-RL Coupling will handle any job in your shop using ¾" to ⅛" connections—from the air line to the air tool. No longer is there any need for various sizes of couplings at different points in your hook-up. The Hansen Series 3-RL, with completely interchangeable sockets and plugs does it all—makes it easy to keep stock of parts in balance—holds inventories to a minimum.

Carefully designed, the Hansen Series 3-RL combines maximum flow with compact construction. Sockets are brass with steel sleeves—plugs are steel. Sockets for use with small hand-operated air tools are available in aluminum.

Write for Descriptive Literature



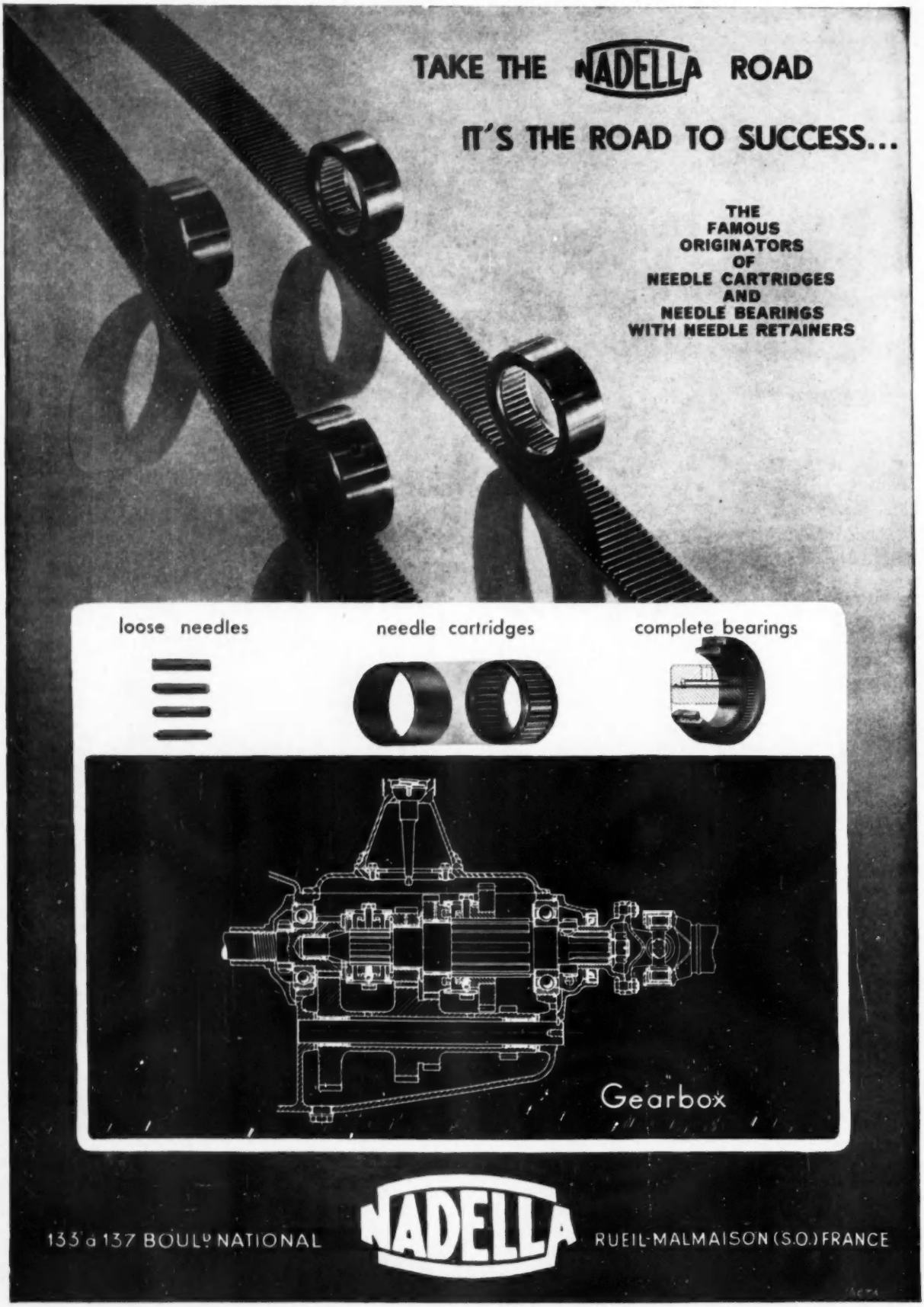
POSITIVE LOCKING

Ring Lock Provides Practically 360° Metal to Metal Contact

• Equipped with automatic sleeve lock, the Hansen Series 3-RL Coupling is quickly and positively connected merely by pushing plug into socket. To disconnect, just turn the sleeve. Locking ring in socket is forced into groove in plug, provides practically 360° metal to metal contact, reduces wear, and insures tight fit.

THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 11, OHIO


TAKE THE NADELLA ROAD
IT'S THE ROAD TO SUCCESS...
THE FAMOUS ORIGINATORS OF NEEDLE CARTRIDGES AND NEEDLE BEARINGS WITH NEEDLE RETAINERS
loose needles
needle cartridges
complete bearings
Gearbox
133 à 137 BOULd NATIONAL
NADELLA
RUEIL-MALMAISON (S.O.) FRANCE

"Smoother stripping -cuts cable costs"

Allison TORQMATIC equipped Osgood dragline owned by J. C. Kitzmiller Coal Co. Unit has 3 yard bucket, 80 foot boom; strips 1000 tons of coal per month

AFTER 2,000 hours of low-cost strip-mining, veteran mine owner J. C. Kitzmiller reports "smoother stripping—reduced cable cost" due to shock-free power transmission in his Osgood dragline. The savings he's made with his Allison TORQMATIC Converter have made him decide to specify Allison TORQMATIC DRIVES in future equipment.

He's spending less for cable replacement in his Osgood dragline because the TORQMATIC Converter protects cable by absorbing sudden shock loads.

He's spending less for dragline repairs, too. The TORQMATIC Converter gives the operator time to cut off power—"throw out the drag"—when the bucket hits a snag, guards boom and drive line from harmful overloads.

And he's getting more work from his drag because with fewer repairs it stays on the job *earning* money—out of the shop *costing* money.

The TORQMATIC Converter matches engine power to load demand, helps prevent harmful engine lugging and stalling. It multiplies engine torque up to 3½ times—broadens the engine's effective horsepower range.

When load demand is equal to, or less than, engine torque the Allison TORQMATIC Converter acts as a fluid coupling to conserve fuel, boost engine life. This feature is standard equipment in every Allison Converter.

You can produce more for less with shock-free TORQMATIC power transmission in your 40- to 400-horsepower gasoline or Diesel equipment. Ask your manufacturer or dealer about TORQMATIC DRIVES in your equipment or write for more information to: Allison Division of General Motors Box 394A, Indianapolis 6, Indiana

ALLISON TORQMATIC CONVERTER

Simple Design — one-piece cast converter elements — minimum maintenance

Compact, easy to install in existing equipment

Designed for power applications in the 40 to 400 horsepower range

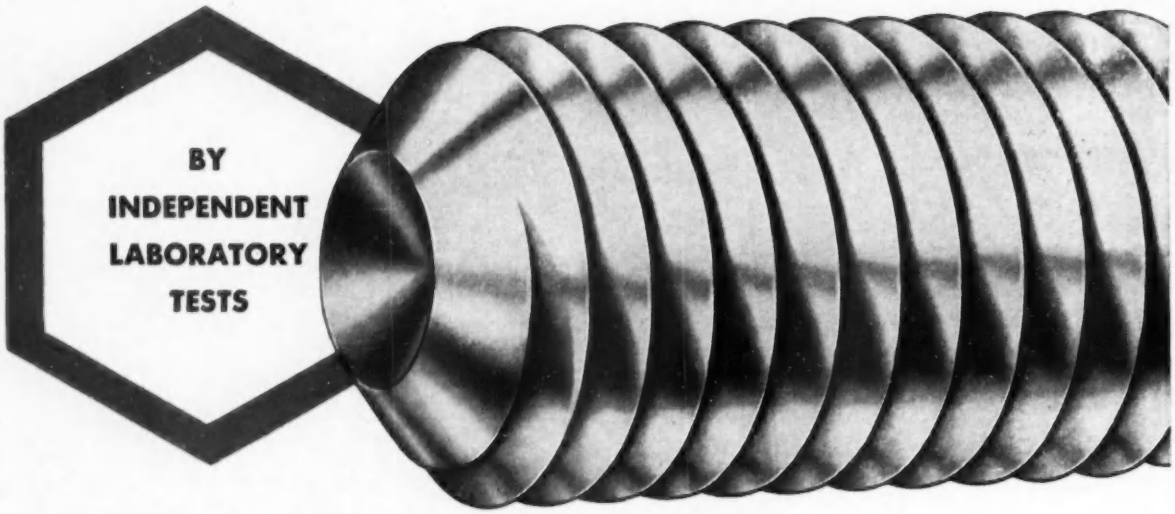
Longer Equipment Life — absorbs shock, eliminates harmful engine lugging, cuts maintenance costs

GM GENERAL MOTORS

Allison **TORQMATIC DRIVES**

Compact, efficient hydraulic drives for Cranes * Trucks * Tractors * Scrapers * Shovels * Drilling and Servicing Rigs

ALLENPOINT SET SCREWS Proved 5 Ways Better



Tested by a prominent independent laboratory against standard cup point and serrated point set screws, Allenpoint socket screws topped them all. In every test — carefully set up to simulate actual installations — Allenpoints outperformed and outlasted competing set screws.

BETTER Cup Point Pattern

Allenpoints make the all-important full circle pattern when tightened up to *ordinary* pressure — the normal force exerted to tighten a socket screw by hand.

BETTER Resistance to Rotation

Deep driven Allenpoints hold longer under increasing torsional strain than any other set screw tested.

BETTER Cup Point Depth

The deeper they drive the tighter they hold. Allenpoints — again at average wrenching pressure — penetrate smoothly and deeply with no gouging, no cutting action.

BETTER Resistance to Longitudinal Thrust

Tighten an Allenpoint held collar to a shaft with a wrenching pressure of only 150 inch pounds. It will take 1200 lbs. of longitudinal thrust to start that collar along the shaft. No pipe extension, no twisted wrenches to get effective tightening pressure. Allenpoints hold tightly at average *hand wrenching* pressure.

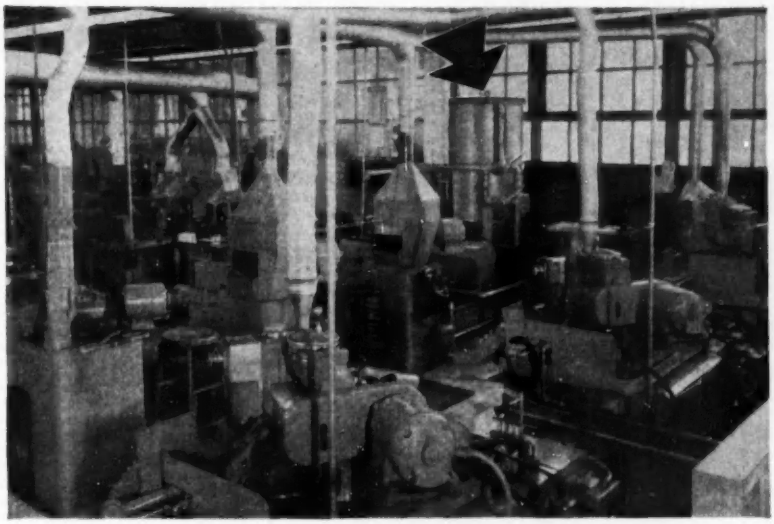
BETTER at Withstanding Vibration

Long after other set screws loosen their grip, Allenpoints hold firm under repeated vibration.

Write our Advertising Department for a detailed, technical brochure on these comparative tests. It's got the facts on the Allenpoint story.

at Cogsdill Twist Drill Company

73% LONGER GRINDING WHEEL LIFE with HOUDAILLE "J" Type Coolant Clarifier



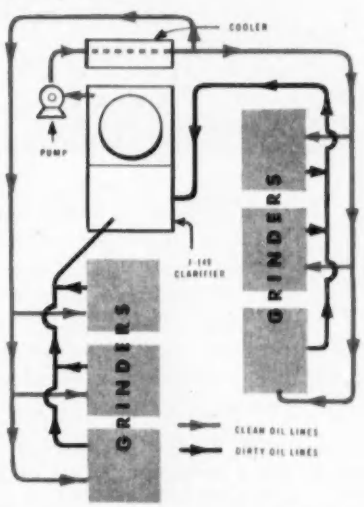
Houdaille J-149 Clarifier shown in operation at Cogsdill Twist Drill Co. 149 filter tubes suspended vertically within clarifier remove all abrasive contaminants from coolant without precoating, filter aids or expendable filter material of any kind.

Drill Manufacturer Also Reports Fewer Rejects, Elimination of Manual Pump and Sump Cleaning

Detroit (*Spl.*)—73% longer wheel life, better product finishes, and indefinite safe-use life of coolant—these are the benefits reported by Cogsdill Twist Drill Company since installation of a Houdaille J-149 Coolant Clarifier.

At Cogsdill—a leading Detroit manufacturer of drills and reamers—the "J" Type Clarifier provides centralized, multi-tube filtration of grinding coolant for six flute grinders.

Here's how the Cogsdill central coolant system operates:



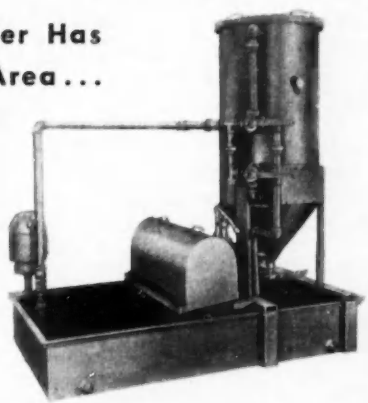
Cogsdill states that grinding wheels, formerly dressed after a run of 75 pieces, now have an average life of 120 pieces. Clean coolant also prevents overheating and subsequent burning of drills.

Elimination of individual grinder pumps and sumps, which had to be serviced every two weeks, has greatly reduced labor and maintenance expense.

Thanks to the Houdaille "J" Type Clarifier, Cogsdill now gets more production from its grinders at less cost and at higher operating efficiency.

NEW MULTI-TUBE DESIGN MEANS MORE FILTERING CAPACITY AT LOWER COST

Houdaille "J" Type Clarifier Has 16,000 Sq. Inch Filtering Area... Self-Cleaning Filter Tubes



The "J" Type is ideal for all water based or mineral oil coolants used in individual machine tools or small central systems. Its 16,000 square inches of filtering area assure complete removal of chips, abrasives, dirt and other solid contaminants . . . keep coolant safe for re-use indefinitely.

Self-cleaning filter tubes, washed free of contaminants during brief backwash interval, require no manual cleaning or maintenance.

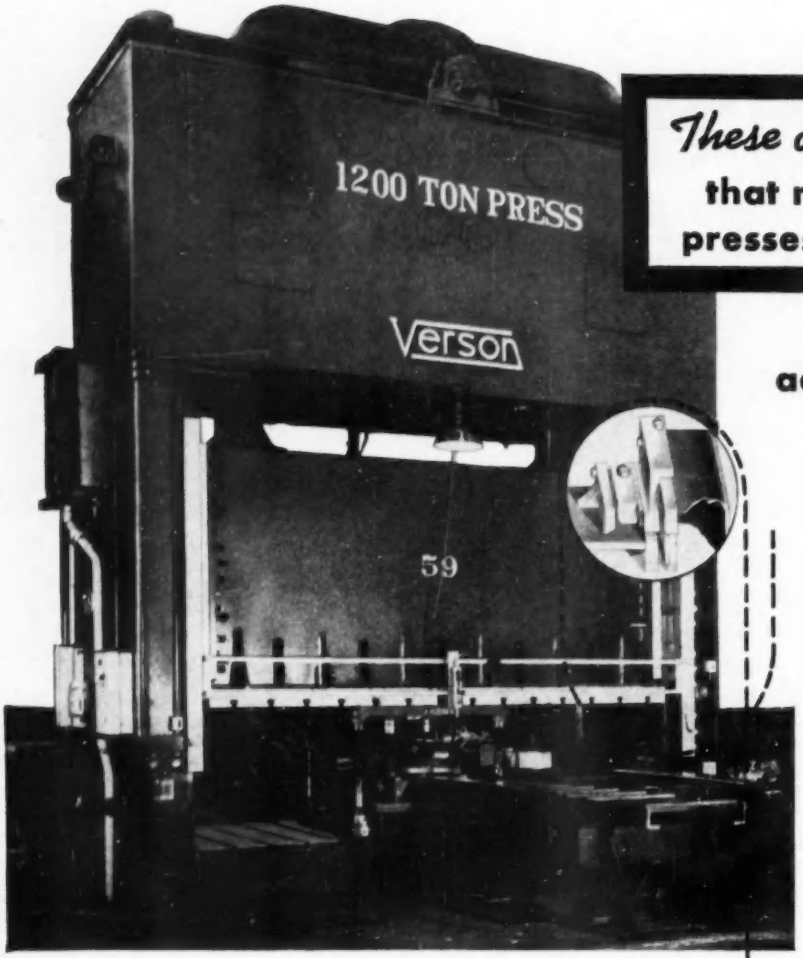
Simplicity of "J" Type's design assures dependable, low cost operation—no need for precoating, filter aids or expendable filter media.

Unit can be operated continuously or intermittently as desired. Several models available depending on capacities to be handled.

Write for equipment bulletin and case history . . . find out how the Houdaille "J" Type Clarifier can extend tool and wheel life and boost overall production in your machine tool operations.

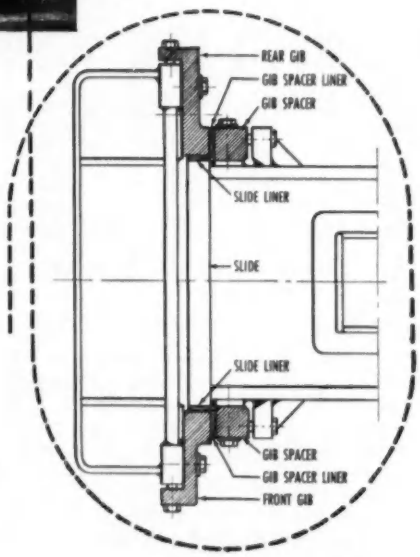
HONAN-CRANE
Oil Purification Equipment

Honan-Crane Corporation 404 Madison Ave., Lebanon, Ind.
subsidiary of Houdaille-Hershey Corporation



These are the features that make Verson presses your best buy

Extra long, adjustable, square gibbing of Verson Presses assures accuracy and long press and tool life



Quality has to be designed and built into a press—it can't get there by accident. A good example is the gibbing of Verson presses. It is extra long to provide accurate guidance of the slide right to left and front to back throughout the stroke. It is adjustable in both directions to make it possible to maintain precise accuracy at all times. To assure peak efficiency at all times, gib bearing surfaces are ground to a mirror finish.

For the user, the design of Verson gibbing means better press performance and longer life for both press and tooling. It all adds up to better stampings at lower overall cost.

Put this advantage and Verson's many other advantages to work in your plant. Whether you require a single press or an entire stamping plant, complete with tooling, we'll be pleased to make recommendations.

A Verson Press for every job from 60 tons up.

Verson

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9307 S. KENWOOD AVENUE, CHICAGO 19, ILLINOIS • SO. LAMAR AT LEDBETTER DRIVE, DALLAS, TEXAS

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

EVERY CRACK has a cause!

It Costs You Less to Find the Cause than Scrap the Parts

Every crack has a cause. Find the cause when cracks *first* occur and you can eliminate the cause of rejects, and the wasted machine time and labor that push up costs when defects go to final inspection undetected. By concentrating production capacity only on *good* parts, you can produce the largest number of acceptable products at lowest cost per piece.

The causes of cracks are many and varied. Magnaflux *finds* the crack and outlines it with a clear mark right on the part itself, showing location and complete extent. Seeing this, and with experience, the cause is traceable. A few case studies below show how leading manufacturers are using "Correctioneering" by Magnaflux* nondestructive inspection methods to control processes — to prevent cracks and scrapping — *to save money.*

BETTER CAST IRON HANDLING *saved manufacturer-owned foundry $60,000 the first year they used sampling inspection with $2,400 Magnaflux unit. Cracked parts had been running 5%. Magnaflux showed the cause to be improper handling of parts after shakeout, which was corrected.*

CORRECTS HEAT TREAT CONTROL — ENDS CRACKED PARTS—*Company making drills and hand power tools uses Magnaflux along with hardness test in setting up every new job on induction heat treat. Samples are run, with changes of time and temperature for heating and water quench, until process is hardening properly without cracking parts. Then volume runs of good parts are begun.*

RECEIVING INSPECTION — REDUCES FORGINGS COSTS — *Large plant uses automatic Magnaflux unit for 100% receiving inspection of rough forgings. Suppliers are evaluated as to their price for good parts. Average rejects are 1%. However, some cheaper suppliers running 2% rejects actually average the lowest prices for parts accepted after inspection.*

LENGTHENS HAMMER RUNS—*At many forge plants, regular "hot" sampling inspection is made with Magnaflux during set-up of the hammer. Run is begun only when it is determined that dies and process will make good forgings. During run, periodic sampling tells if defects start to occur. Runs are continued as long as good parts are made. Longer runs and reduced set-up time result.*

CONTROLS COLD HEADING — GETS MORE USABLE PARTS — *Magnaflux is used to (1) inspect "wire ends" to assess gross quality of wire rolls and (2) for sampling inspection of upset parts at the cold heading machine. Seamy stock or worn dies are quickly caught before thousands of defective parts are produced.*

IMPROVES CASTING DESIGN — REDUCES REJECTS — *At many foundries, inspection with Magnaflux is used whenever a high percent of cracks are found in any run or in pilot runs. Run is stopped and casting technique is varied, using Magnaflux on each test pour to see if cause of defect is eliminated. Run is resumed when cause has been corrected and cracks avoided.*

PRODUCES BETTER, MORE DURABLE TOOLS—AT LOWER COST—*Tool makers now produce more uncracked tools, with resulting lower costs, by using Magnaflux or Zyglo* for both rough state and final inspection to evaluate cracks and correct causes. Tool users inspect new tools and reworked tools. Uncracked tools insure longer runs for each machine set-up.*

GETS LONGER MACHINING RUNS — SAVES TOOLS — *Manufacturer of small, low-cost gray iron pistons found that cracks in the pistons were causing expensive breakage of carbide tipped tools. One hundred percent inspection with Magnaflux-Magnaglo has removed this hazard and reduced overall costs.*

IMPROVES GRINDING CONTROL AND TECHNIQUE — *Improper wheel speed, hardness, cleanliness, coolants or faulty grinding techniques are quickly spotted and eliminated through sampling inspection of output with Magnaflux-Magnaglo*. Also, when high residual stresses or poor stress relief cause grinding trouble, Magnaglo and hardness test combine to pinpoint necessary correction of stress relief practices.*

Ask to have a Magnaflux engineer investigate with you, how "Correctioneering" by Magnaflux may save you money. Or, write for our free booklet "Finding the 'How and Where' of Lower Production Costs"

*Magnaflux, Magnaglo and Zyglo are registered trade marks of the Magnaflux Corporation.

MAGNAFLUX CORPORATION

7304 West Lawrence Avenue, Chicago 31, Illinois

NEW YORK 36 • PITTSBURGH 36 • CLEVELAND 15 • DETROIT 11
DALLAS 19 • LOS ANGELES 58

Quantity
PRODUCTION
of
GREY IRON CASTINGS

*

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

*

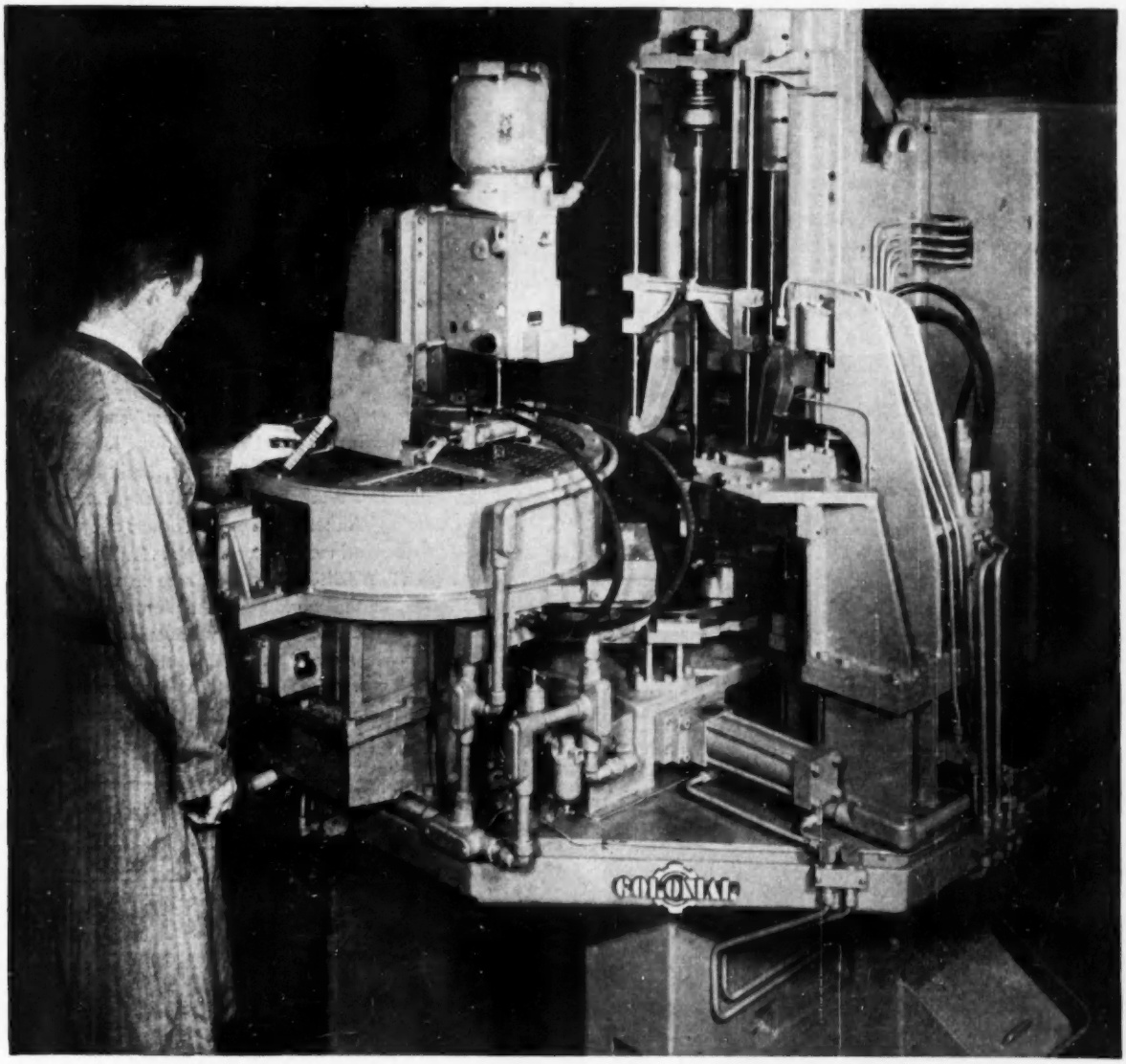
ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE



BROACHING—"PLUS"

200 finished pieces per hour

This Colonial 6-ton 24-inch stroke pull-down machine, broaches, drills and stamps more than 200 camshaft sprockets per hour. Cycle is completely automatic as follows: 1) drill .2656" hole in web, 2) broach .1895" keyway in bore, 3) stamp timing mark on sprocket, 4) eject completed parts onto a conveyor. Operator merely keeps loading magazines filled with parts.

Broaching-"Plus" is a new trend in broaching machines today. Integrating broaching into a machining sequence on a part, so that the operator has less work handling, cuts costs and speeds up processing.

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UNIFIED BROACHING is the key to successful broaching

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A Name to Remember

Experience is a valuable asset in the development, manufacture and distribution of any product. In this respect we offer you the cumulative benefits of *Continuous Service to Industry Since 1887* . . . including origination and pioneering of mass-production equipment for the economical manufacture of washers.

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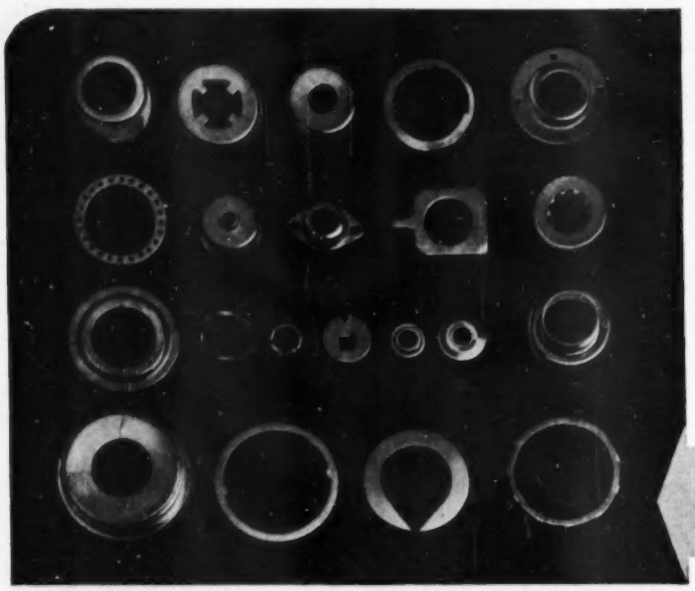

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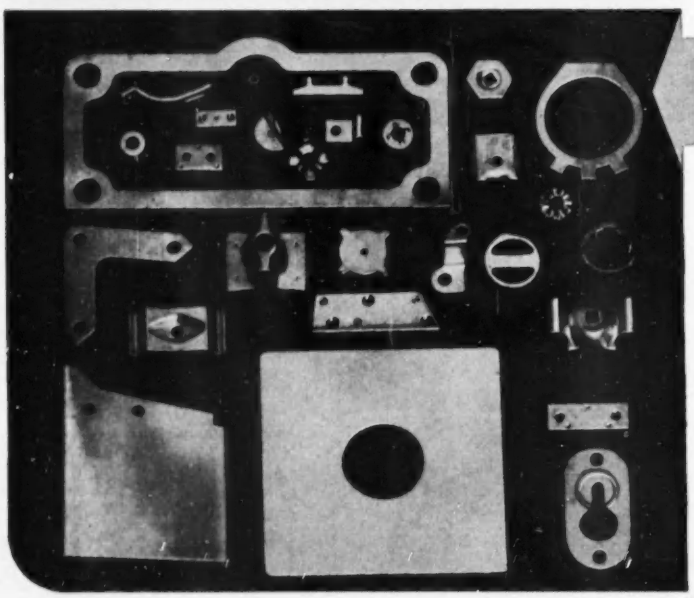

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If it can be punched out of metal—if die-making ingenuity and tool-making facilities can provide the means for producing stampings to meet your production specifications; if the job can be handled most advantageously as a stamping—again, "MILWAUKEE WROT" is the name to remember. Here is a soundly established source of supply you can rely on — plus *Quality Standards* that are a source of pride to us, as manufacturers, and a source of satisfaction to our most discriminating customers. We'd like to serve you.

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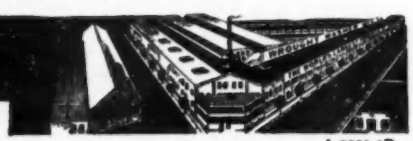

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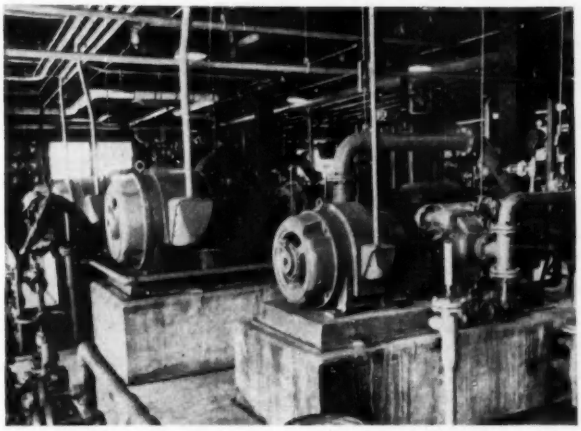

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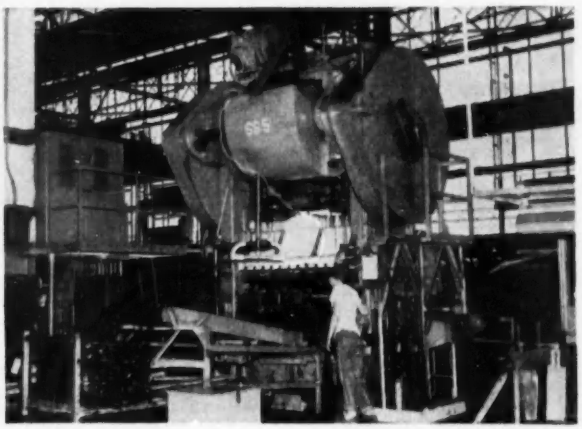
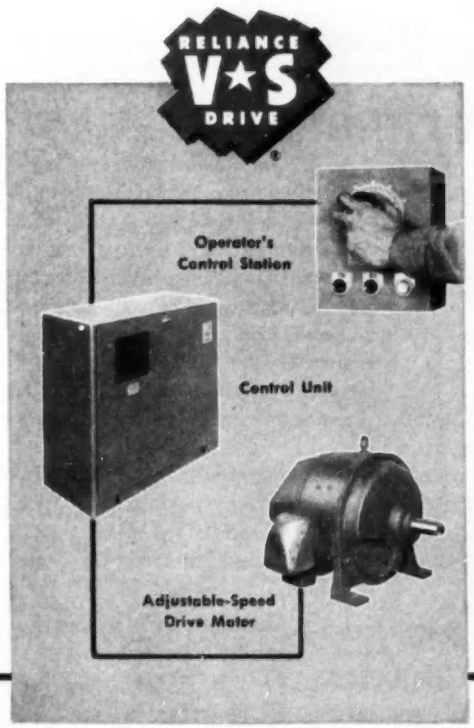


On stamping presses Reliance V★S Drives automatically provide proper metalworking speeds on each cycle, enabling parts to be produced to close tolerances at fast rates of production.



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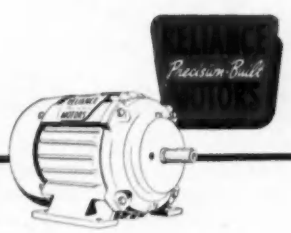

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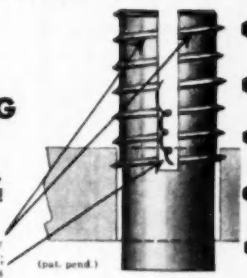
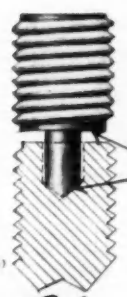


Cutting thread extends only around top or slotted section; cuts on both sides of hole; chips are gathered in slot instead of accumulating below. Self-aligning, self-tapping, self-locking! "Pulls itself in." Can be supplied with any type set screw point. In full range, including the smaller sizes. Write for new illustrated, descriptive bulletin.



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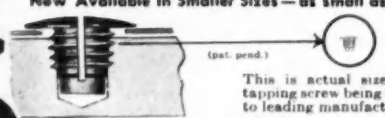

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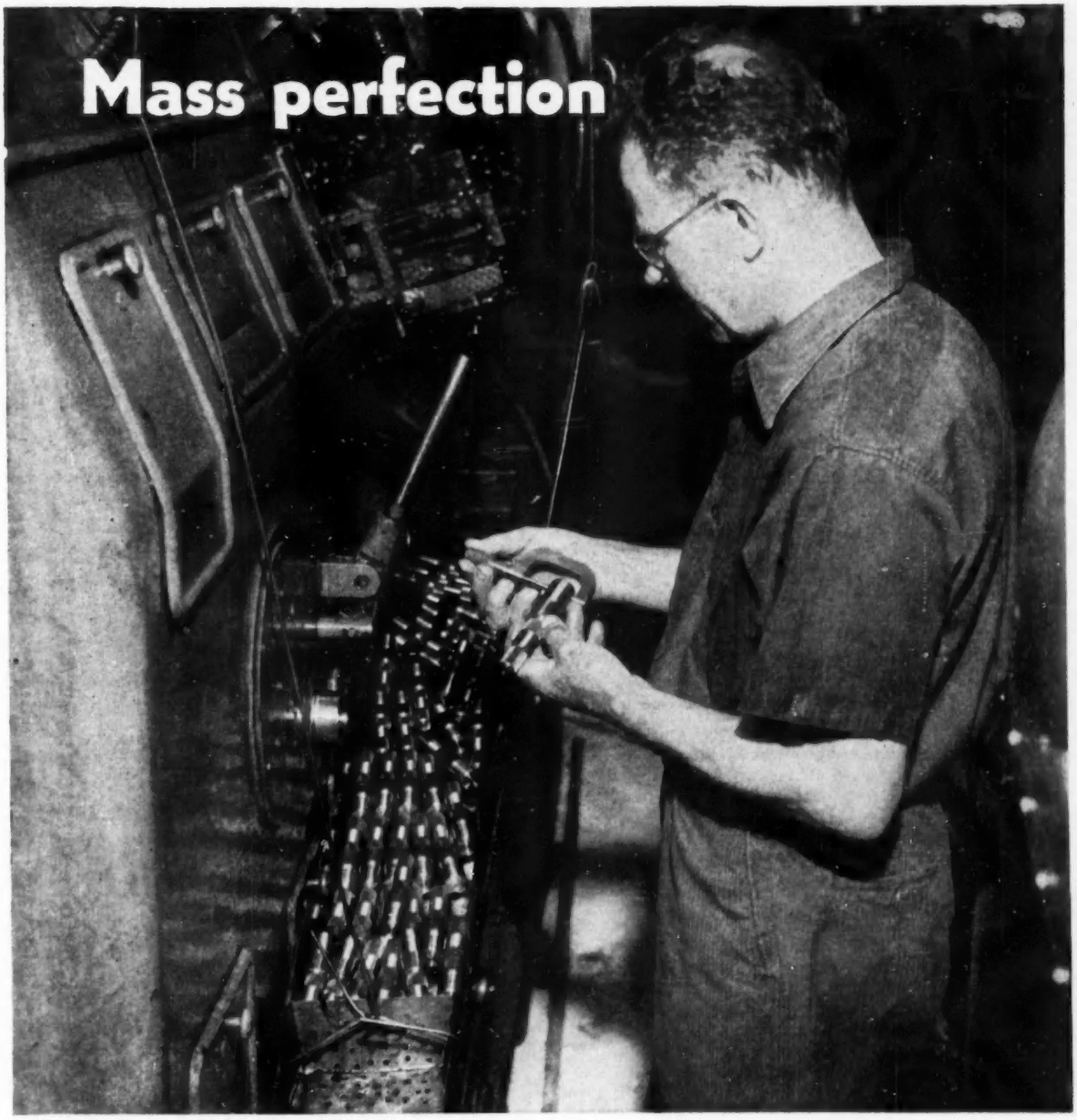

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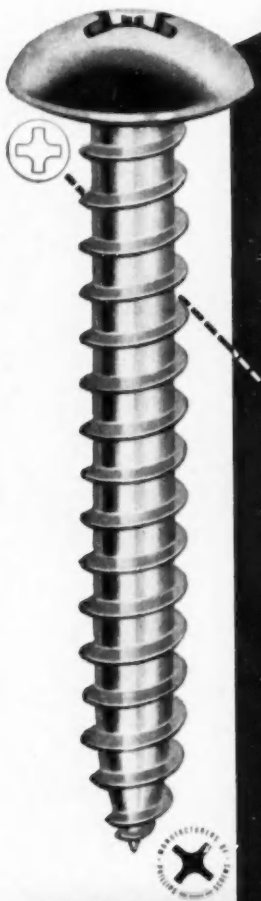

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Underdrive press design minimizes press height on production floor. This means better lighting and more freedom of material flow. Press area is cleaner and safer for all drive mechanisms and attendant oil and grease are in separate area. There are no overhanging projections.

Perhaps you, too, can use Cleveland underdrive presses to advantage. But whether your needs call for single, two or four-point presses of overdrive or underdrive design let us show you why Cleveland presses are your best buy for operating economy.

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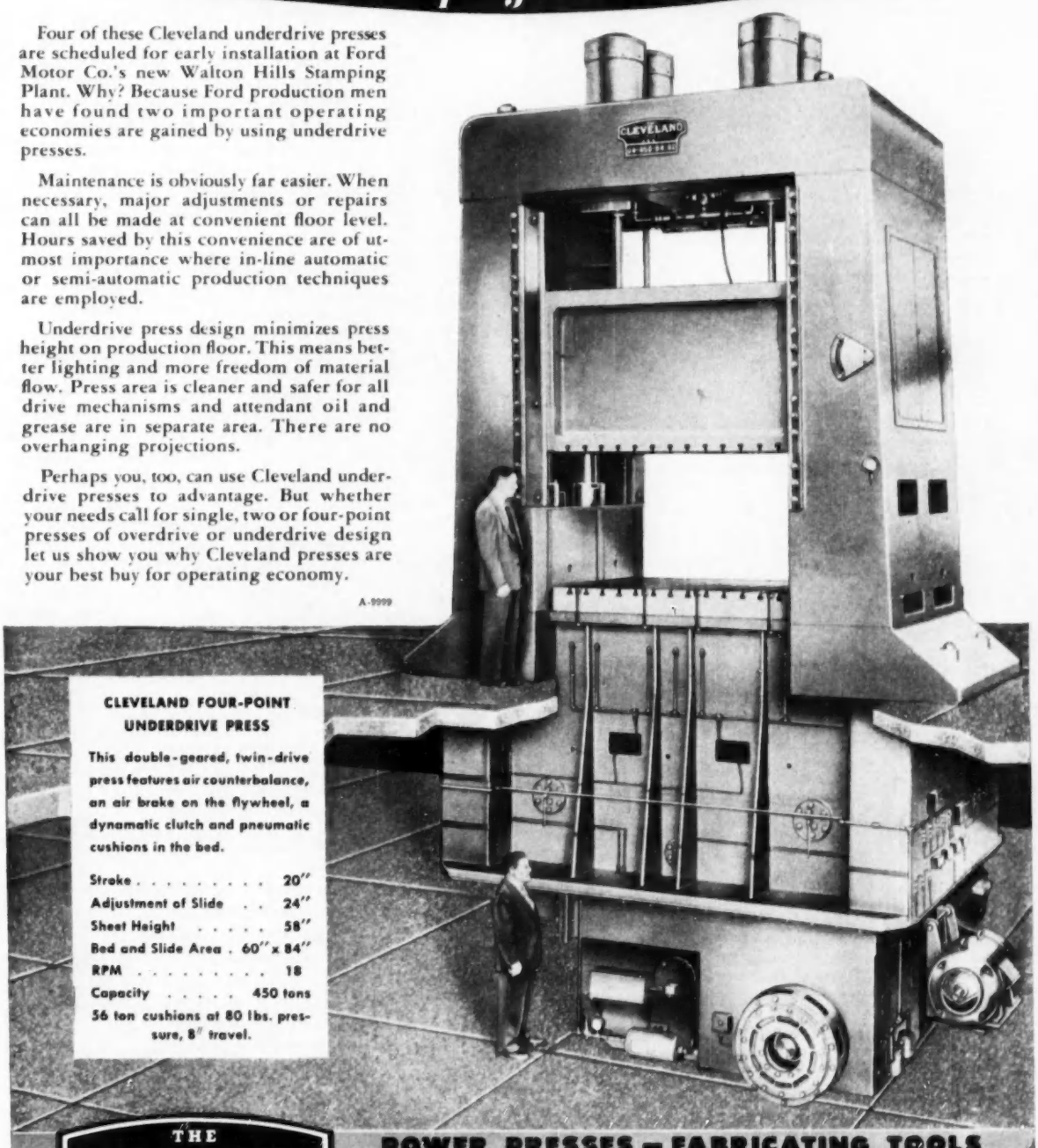

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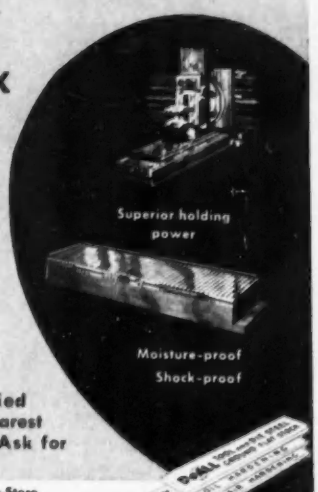

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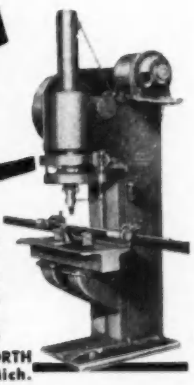

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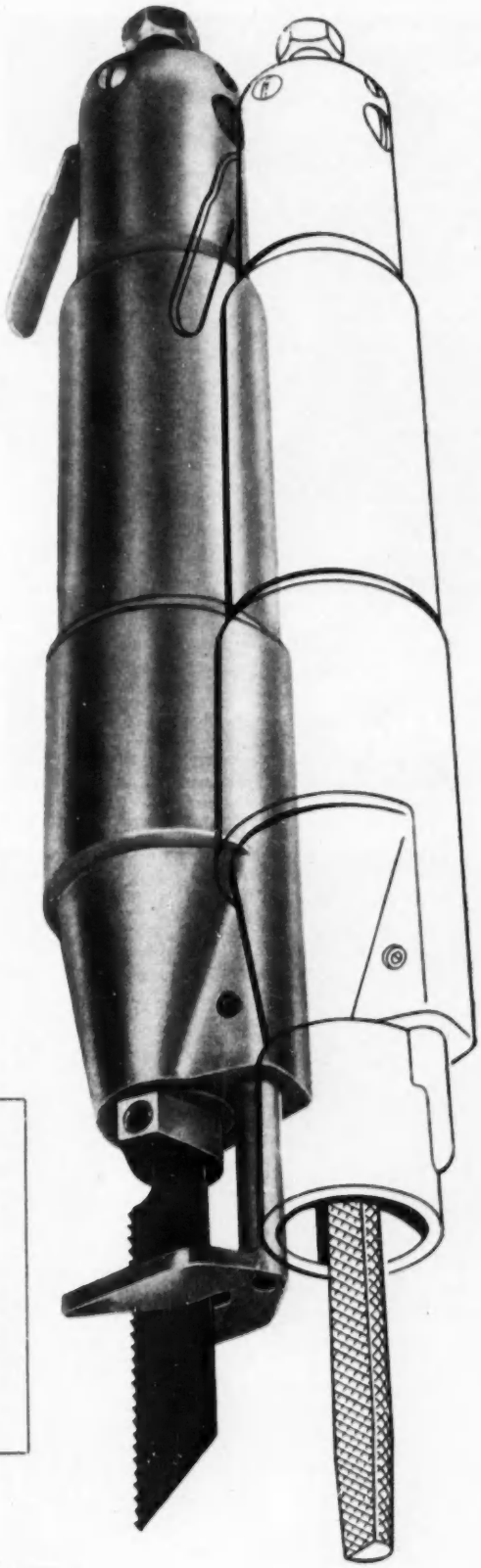

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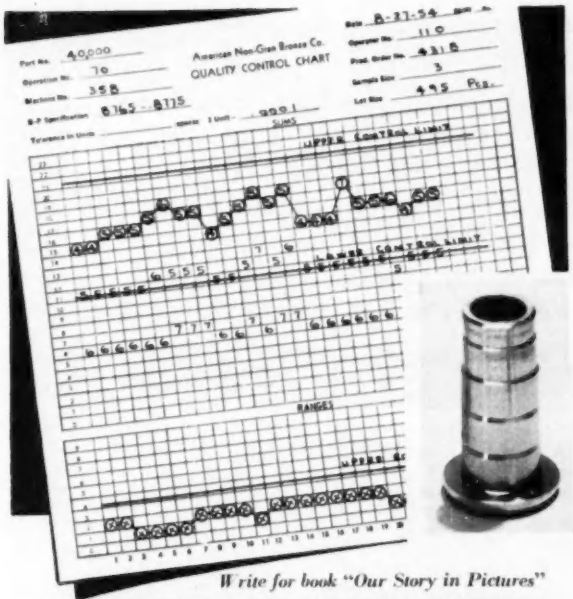

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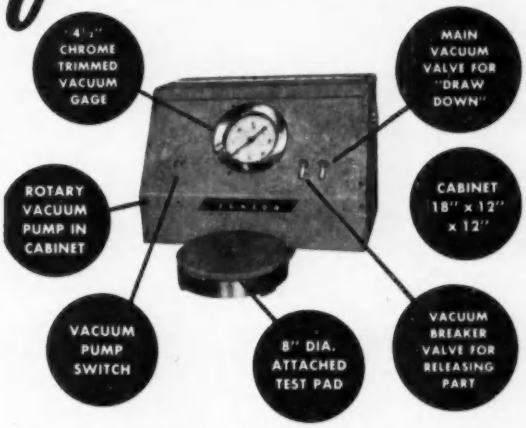
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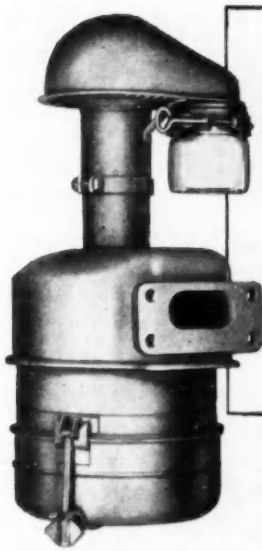

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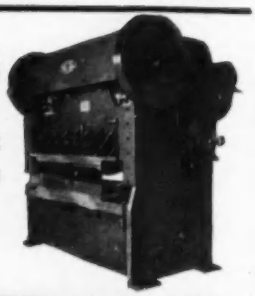

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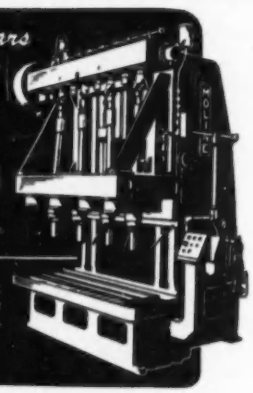

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2. Reduce contour sawing cost as much as 75%
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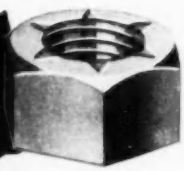
Machine Tools • Cutting Tools • Gages 37

For stress, wear or vibration a

GRIPCO LOCK NUT



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GRIPCO PRODUCTS INCLUDE: Gripco Lock Nuts, New Gripco "Clinch" Nuts, Gripco Hi-Nuts, Gripco Pilot-Projection and Countersunk Weld Nuts with or without Gripco locking feature.

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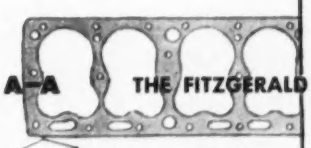

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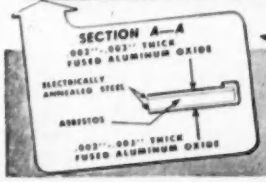

THE FITZGERALD MANUFACTURING CO.
Torrington, Connecticut

FITZGERALD Gaskets SINCE 1900

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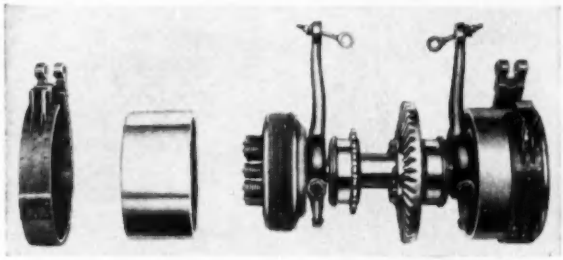
D8 STEERING CLUTCHES AND BRAKES MUST BE TOUGH

...one reason why Caterpillar® uses R/M FRICTION MATERIALS!



Exploded view of steering clutch assembly for the Caterpillar D8 Tractor. R/M's sintered metal is used as clutch facing.

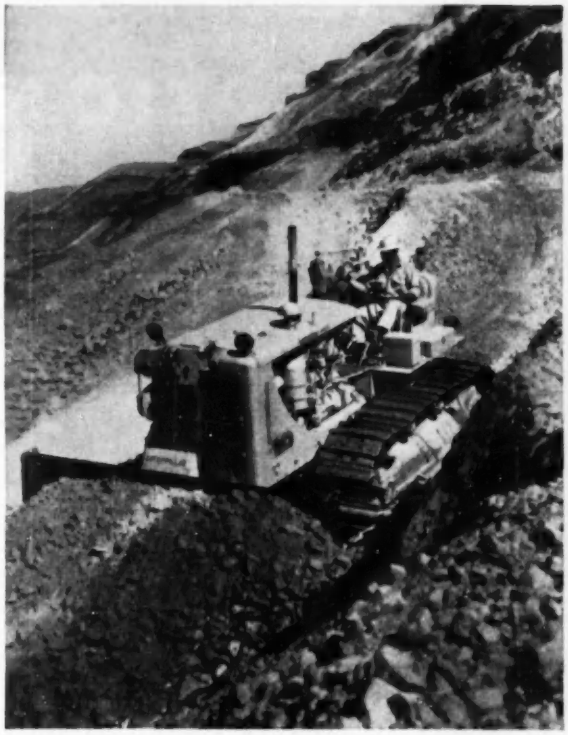
Steering clutches and brakes on the rugged D8 Caterpillar Tractor must stand up under heavy punishment. Raybestos-Manhattan Friction Materials are used to give top performance in grueling, day-after-day operation.

For D8 steering clutches, Caterpillar uses R/M's W-2003-G Sintered Metal, a heavy-duty, general purpose bronze compound which can be used either dry or in oil.

For D8 steering brakes, Caterpillar uses R/M's M-2320-A Dry Process, a uniform friction compound which is stable under extreme conditions.

That's typical of Raybestos-Manhattan's tremendous versatility in the friction materials field.

Raybestos-Manhattan, for over 50 years the world's largest maker of friction materials, offers you the most complete line in the industry—from woven and molded asbestos to semi-metallic compounds and sintered metal—plus the facilities of seven great plants, with their research and testing laboratories, for formulating special combinations for special needs.



Whatever your requirements for friction materials, Raybestos-Manhattan has the experience and the production capacity to help you meet them exactly. And working constantly with all kinds of friction materials, R/M is in a unique position to give you impartial advice. Let our engineers work with yours to solve your toughest problem.

"50 Years on Tracks"

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Raybestos-Manhattan is proud to have contributed in the development of these modern earth-moving giants.

R/M

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MECHANICALLY Zollner Lock

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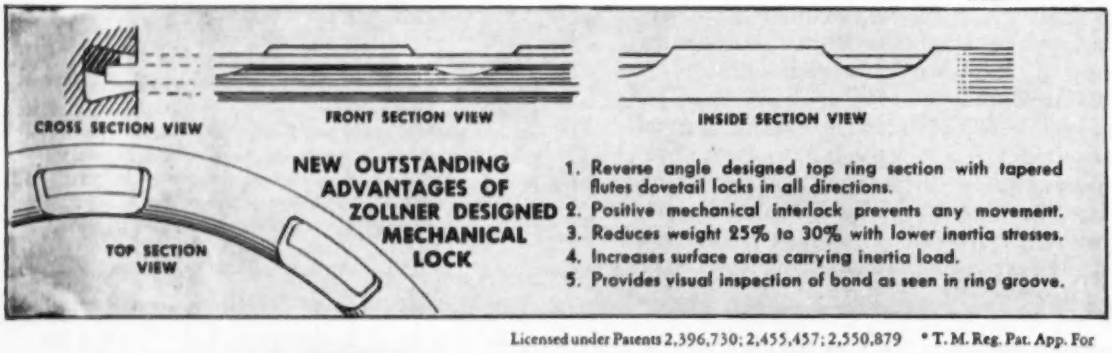

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in cooperation with engine builders

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Oscar P. Martin
Lakewood 7, Ohio

J. Ramsey Reese, Inc.
New York 7, New York

J. M. Murphy
Manchester, Connecticut

Russell T. Brosius
Philadelphia 3, Pa.

Sam T. Keller
Detroit 1, Michigan

W. L. Barth, Jr.
Chicago 34, Illinois

C. W. McNeil
Houston, Texas

Leonard F. Berg
St. Paul 14, Minnesota

Thom Lundeen
Moline, Illinois

Forrest Maschner
St. Louis, Missouri

A. J. Murphy
DeWitt, New York

Richard C. Dudek
Beverly Hills, California

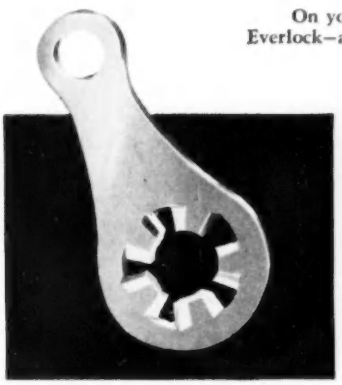
P. L. Robertson
Milton, Ontario, Canada

Sam T. Gleaves
Louisville 5, Kentucky

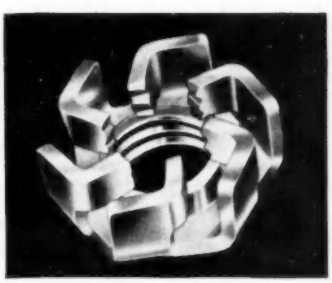
J. J. McIntosh
Atlanta 6, Georgia

Donald G. Teeling
Indianapolis 44, Ind.

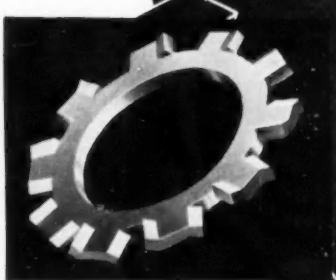
Oregon Indus. Factors
Portland 1, Oregon



TERMINALS
Plain and lock types.



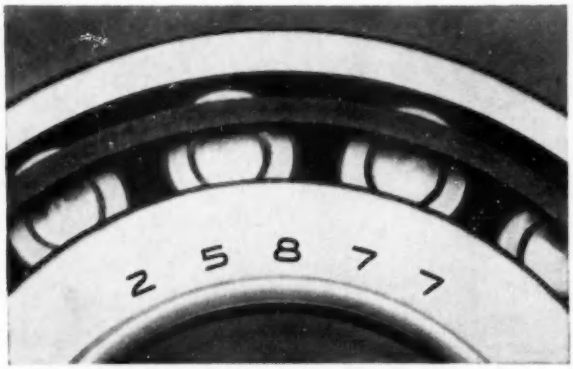
LOCKNUTS
Both National fine and National coarse threads.



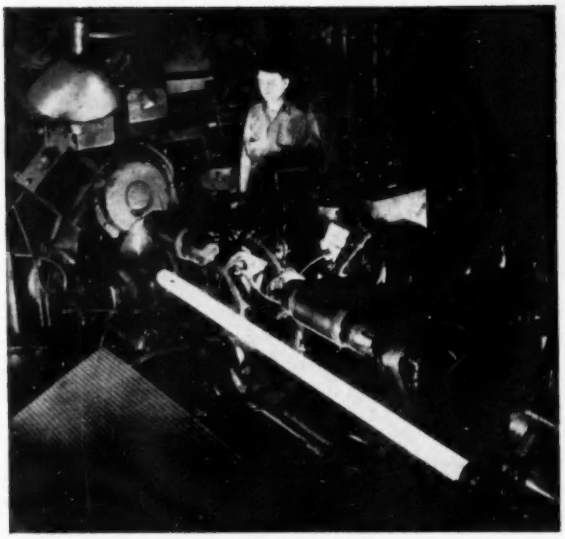
LOCKWASHERS
Internal, external and special types.

THOMPSON-BREMER & COMPANY
520 North Dearborn Street • Chicago 10, Illinois
SUBSIDIARY OF AMERICAN MACHINE & FOUNDRY CO., NEW YORK

"EVERLOCK" IS A REGISTERED TRADEMARK OF THOMPSON-BREMER & COMPANY



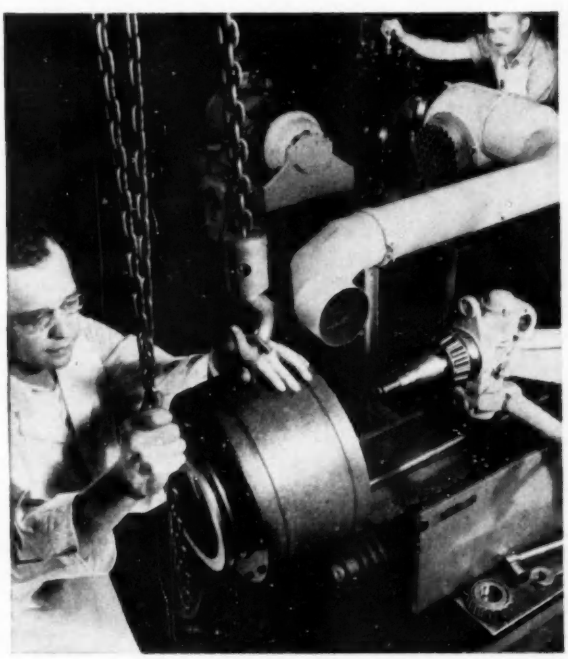
YOU CAN TELL FROM THE 25877 stamped on the cone, coupled with 25821 on the cup, that this tapered roller bearing is a type and size commonly used on rear wheels. But when you also see the trade-mark "Timken" stamped on the bearing, the number tells a much bigger story—about the quality that's built into the bearing and the service that goes with it.



WE NEED THE WORLD'S BEST bearing steel so we make our own. This way we can control quality every step of the way, from melt shop to finished bearing. Shown above is a special piercing mill that makes seamless tubing for Timken® bearing cones and cups. This mill uses the special Timken-Company-developed "elongator" process that provides closer size tolerances than conventional mills.

BIG NUMBER THAT TELLS AN EVEN BIGGER STORY

ACCURATE TO 50 MILLIONTHS of an inch, this Universal Measuring Machine checks the gages and machine parts used to make Timken bearings. The Timken Company has one of the world's best-equipped gage inspection rooms. It contains precision equipment, some of which is so unusual we had to develop it ourselves. It's another reason Timken bearings are the number-one value for your car's moving parts—the vital zone.



WE WORK FOR YOU, making special tests and studies. This test simulates actual driving loads on truck front axles. It "runs" axles thousands of miles, helps show truck manufacturers how to get longer bearing life. Service like this is another reason for always specifying "Timken" with the bearing number. And for full value always use a Timken bearing cup with a Timken bearing cone. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".

TIMKEN is number 1 for VALUE where value counts most . . . in the vital zone

TRADE-MARK REG. U. S. PAT. OFF.

NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL AND THRUST → ← LOADS OR ANY COMBINATION